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HANDBOOK ON
DIVERSITY IN SOME OF THE INDIAN BUTTERFLIES
(INSECTA : LEPIDOPTERA)

I.J. GUPTA
MRIDULA MAJUMDAR

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PREFACE

Butterflies hold unique position among insects on account of their bright and striking colouration and varied pattern on wing surfaces which have enhanced their beauty. They are fascinating to one and all. They are predominantly phytophagous and feed up on a variety of plant species. Diverse topographical features and varied climatic conditions of the country have contributed to the richness of plant and animal diversity. Butterflies, as pollinators, have also played a significant role in plant diversity.

Tremendous rise in human population has increased their demands for agricultural land, industries, dams, roads, railways, power lines, timber, fuel, mining, tourism, etc. To meet these needs, there has been encroachment upon the natural habitat of wild animals - the forests. The land, air, water pollution and pesticides to protect agriculture have also resulted in the deterioration of the habitats of animals including the butterflies.

'Handbook on Diversity in Some of the Indian Butterflies' is the outcome of the biodiversity of India programmes of the department. Efforts have been made to provide information on different aspects of the life of butterflies– habits, habitat and ecology and food plants along with life-histories of some species. The diagnostic characters and morphological characters of species and intraspecific variations have been given. The species have been included considering their interesting features- beauty, size, names after those of Indian Gods and Goddesses, seasonal variation, sexual dimorphism, polymorphism, protective devices evolved for their survival, methods of flight, metallic coloration, symbiotic relationship, pests of fruits and vegetables, of common and rare occurrence, etc. The illustrations of species/ subspecies of these butterflies have also been provided. It is hoped,

that the given information may arouse curiosity among the readers to know more of the wonderful world of these magnificent insects.

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I. J. Gupta

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INTRODUCTION

Butterflies are the most commonly observed among insects. They are the most beautiful and spectacular forms of life with varied sizes, shapes and all kinds of colours and patterns. Reference to them as whites and yellows (Pieridae), Browns (Satyrinae) and Blues (Lycaenidae) is owing to their dominant colours.

Their attractive colour patterns have enhanced their aesthetic value. The wonderful phenomenon is inscription of English alphabets and numerals on the wing surfaces of some of the species of butterflies (Fig.1). They are natural pollinators and have close relationship with the flowering plants. They are good ecological indicators and more sensitive to climatic changes. During monsoons they are dark coloured but in dry months they show dull or pale colouration. Their occurrence in a habitat indicates the presence of particular species of plants and animals. During developmental stages, their larvae or caterpillars feed on a variety of food plants – crops, fruits, vegetables, forest trees, etc. Their association with coccids, ants, etc., is also interesting. They play a significant role in the food chain, being mainly herbivores on one hand and prey to their predators like amphibians, reptiles, birds and mammals, on the other.

Both the butterflies and moths belong to the Order Lepidoptera of the Class Insecta. The word *lepidos* means scales and *ptera* means wings, therefore, the Lepidoptera are insects having wings covered with scales, which distinguish them from all other insects. The butterflies are diurnal and distinguished from moths by the presence of knobbed antennae, wings held vertical at rest, head and thorax well demarcated, hind wing produced at base near costa, eggs dome or upright shaped, larva/caterpillar with five pairs of legs, body of larva may be covered with spines, chrysalid or pupa usually hanging from a twig secured by a body band on the ground enclosed in a leaf.

Fig.1- Inscription of English 'Alphabets' and 'Numerals' on wing surfaces of butterflies (After Kjell Sandved)

Fig.2- Map of India

There are over 17,000 species of butterflies known over the globe, of which about 1500 occur in India (Fig.2). India is one of the 12 megadiversity centres in the world. Moreover, out of 27 hot spots in the world, two, *viz.*, North-eastern India and Western Ghats are very rich in diversity of species and their population

They are commonly seen before and after monsoon months depending on the climatic conditions in various parts of the country.

In many parts of India, the spring season is the favourable time for butterflies whereas in arid parts of North and Northwest India, the monsoon and post-monsoon periods are favourable months as the spring is delayed until monsoon. In the hills, butterflies are available only for a short period because the spring is much delayed and summer being very short. In South India, as seasons are not well defined, the best time for butterflies depends on the local rainfall conditions.

They are found in jungles and forests of plains, hills, mountains where they prefer damp, shady and sandy places, near streams. Their larvae or caterpillars feed on tender leafy plants but adults often visit flowers of nectariferous plants. Some of the species are attracted to saps of injured plants, rotten fruits, sugars, horse droppings and toddy. Their food plants may be specific or many. Jungle, forest or upland meadows and flower gardens are considered favourable collecting places.

The colour of the wings or body of butterflies is due to structure of the scales or the pigments carried by the scales. The structural colours are produced by the phenomena of interference and diffraction. In interference, colours arise when the wall of the scale is built up of a number of excessively fine films separated by material of a slightly different refractive index whereas diffraction plays role when the surface of the scales bear very minute ridges and to other physical conditions. The blue, purple, shot green, gold, other metallic and iridescent effects are structural in origin. The pigments responsible for the majority of colours are produced by the body of butterfly including excretory product (Uric acid) or derived directly from the larval food (flavone, xanthopterin). The pigments giving a variety of colours are- melanin (black and blackish brown), leucopterin (white), xanthopterin (yellow), flavones (creamy and yellow), chrysopterin (orange) and erythropterin (red).

The butterflies exhibit variations in colouration of markings and pattern on wing surfaces.

Sexual dimorphism: When the male and female of a species are distinct in colour and pattern e.g., *Hypolimnas bolina* (Linnaeus).

Individual: When any of the sexes of a species shows two or more than two markedly different individuals in colour markings, pattern and structural features, then that individual is called dimorphic or polymorphic (.both polymorphic male and female of *Papilio memnon agenor* Linnaeus and trimorphic female of *Papilio polytes* Linnaeus).

Seasonal: The individuals of a species may bear prominent and bright coloured markings and patterns in wet season but dull, faint, obscure and blurred colours in dry season e.g., *Melanitis leda* (Linnaeus). The seasonal variations are also influenced by the number of broods in a year.

Geographical: The individuals in a population of a species e.g., *Pachliopta aristolochiae* (Fabricius), may show distinct regional differences giving rise to subspecies.

Form: The individual exhibits localised differences e.g., *Euploea core* (Cramer).

Aberration: Here the individual shows casual variation in structure, colour or markings due to some defect of development (*Papilio polytes* Linnaeus).

In males, there are specialized scent scales, plumules or androconia which form the scent producing organs like brushes, brands or pouches for distributing odours for attracting the females. These structures are secondary sexual characters and these are associated with the displacement or distortion of some of the veins or the dorsum of the fore wing may be bowed.

Life history: Lepidoptera are holometabolus insects i.e. with complete metamorphosis involving four distinct stages- egg, larva or caterpillar, pupa or chrysalis and the imago or adult in their life cycle (Fig. 3. A-D).

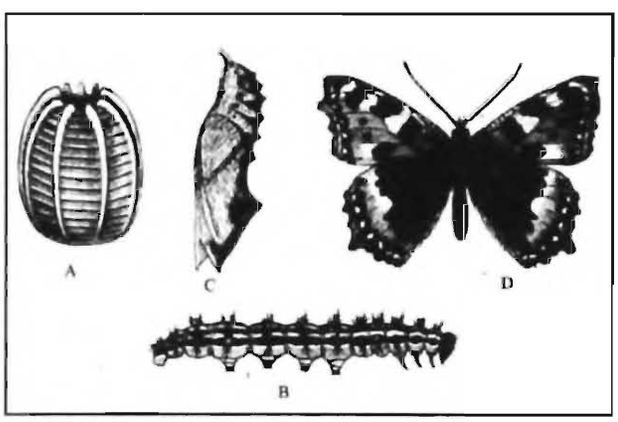


Fig.3- Four stages in the life cycle of a butterfly: A-Egg, B-Larva or Caterpillar, C-Pupa and D-Imago or Adult.

The colouration and scent organs on wings, and in some species on hind tibiae help males recognising the females. After copulation, spermatophores are deposited into the bursa of the female. The eggs passed from ovaries through vagina to the ovipositor are fertilized en route with the spermatophores discharged from the bursa. Simultaneously, an adhesive secretion is furnished to the egg through another tube to ensure that egg attaches to the food plant.

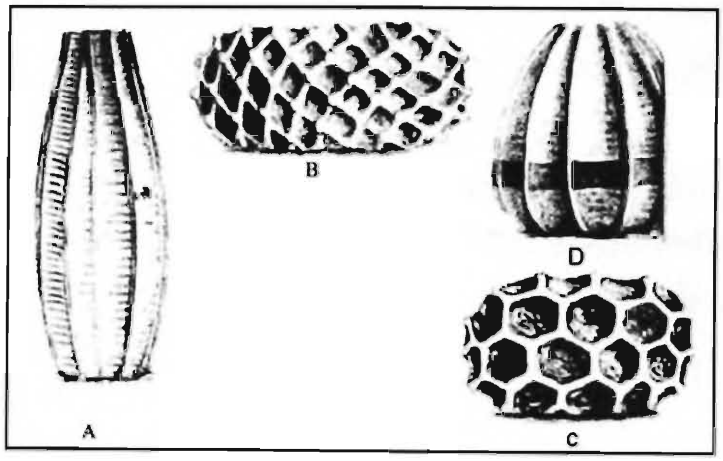


Fig.4- Eggs of butterflies: A Pieridae (Cabbage White), B, C- Lycaenidae (Small Blue), D- Nymhalidae (Small purple).

Egg: The eggs may be laid single or in batches and vary in size. They may be spherical, cylinderical, dome or turban-shaped (Fig. 4. A-D). The surface of the egg may be smooth or beautifully sculptured. At the top end of the egg is a tiny opening called the micropyle.

Larva: After hatching, the larva eats eggshell as its first meal (Fig. 5. A-C). The larva is usually cylindrical or may be spindle-shaped (Browns) or like woodlice (Blues). Its body surface may be smooth or with fleshy protrusions, spines or hairs. The head may bear horns and tail may have points. The larva is the feeding and growing stage. It usually undergoes moulting five times. At each new stage it is called a instar. The first three instars differ markedly in appearance than the last two instars, which differ mainly in size. Its body is divisible into 14 segments (Fig. 6. A). The first segment is head (Fig. 6. B) bearing

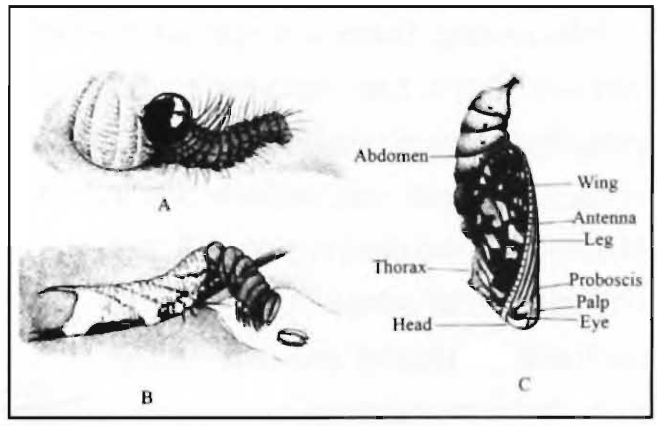


Fig.5- A: After hatching, caterpillar eating of its egg shell as firest meal. B: Caterpillar shedding its skin and the old head capsule. C: Chrysalis of a butterfly

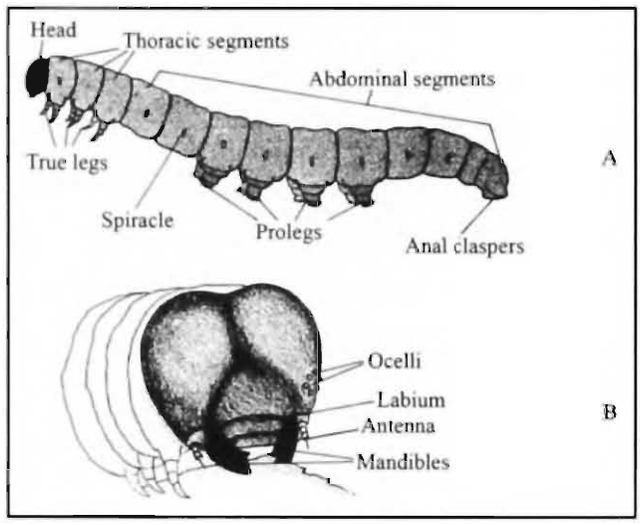


Fig.6- A: Body parts of a caterpillar, B: Parts of head of a caterpillar

two groups of tiny eyes, the rudiments of antennae, a spinneret in the mouth for making strands of silk, and two pairs of jaws, the large and horny mandibles as well as small and soft maxillae. The thorax is three segmented, each segment bearing a pair of true legs. The segments 7th to 10th and 14^{th,} each carrying a pair of fleshy suckers or pro-legs. Each proleg bears minute hooks called crochets on the soles of the foot. These hooks enable the larva to hold on the substratum. The pair of prolegs on the 14th segment are larger and stronger than the others and are called the claspers.

The larvae are usually herbivorus i.e. feeding on vegetation- leaves, flowers, buds or inside fruits. A few representatives of Lycaenidae like *Liphyra brassolis* Westwood (Moth Butterfly), *Spalgis epeus* (Westwood) (Ape Fly) feed on ant larvae and scale insects, respectively.

Pupa or chrysalis: In the fully grown caterpillar, colours fade and it starts searching a food-plant for pupation. For this, it spins a pad of silk to which it attaches itself by the claspers. In some families, it also makes a silken loop round the body. After a period of rest, it begins to wriggle and make undulating movements from the tail up the body so as to cause rupturing the skin dorsally near the head. The skin then moves backwards to form a wrinkled mass about the tail. The pupa draws tail out of the old skin by some minute hooks in the cremaster or end of the abdomen, fixing it again to another part of the pad of silk. Simultaneously, it casts-off covering sideways and lastly falling to the ground. At this stage, the pupa is soft, colourless and capable of movement. Soon, it becomes smaller and broader, the case hardens, the colours develop and its movements cease.

The fixation of pupa varies in different families. With the head upwards, it may be fixed by the tail and supported by a body band (Papilionidae and Pieridae:), pupating in a rough cocoon below the surface of the ground in Apollos (*Parnassius* Latreille); fixed by tail only (many Nymphalids); pupating in a hollow in the ground without suspending itself (some Satyrines); suspended rigid by the tail only in Libytheinae (*Libythea* Fabricius); fixed by the tail on a twig, leaf or on the ground, with or without a body-band (many Lycaenids), and fixed by the tail and supported by a body-band in Riodininae. In Hesperiidae, the pupa is fixed by tail and supported by a body-band within a cell made of a leaf.

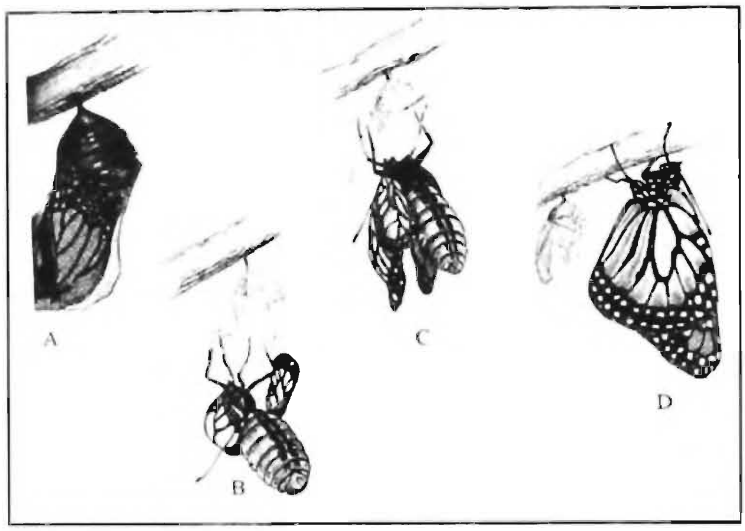


Fig.7- A-D: Successive stages in the emergence of a butterfly from a chrysalis, the wings expanding from tiny structures within a short time.

Imago or adult: After emergence (Fig. 7 A-D), the butterfly moves off to a convenient twig to dry itself in the sunshine. At first, wings are wrinkled and shrivelled and then gradually expand. Initially, the wings hang down limply, thereafter they harden, open and expand in sunshine. In half an hour, the butterfly is ready to fly off and find a mate.

Puddling: In the open or shady places, the wet and muddy patches contain sodium and mineral rich water from the urine, cow dung and excreta of other animals. On emergence, the male utilizes its sodium and other minerals for formation of spermatophores which are transferred to the body of the female during copulation. These sodium deficient males of one or several species congregate (Fig. 8) at such places and move their legs in the mud, known as puddling or mud puddling, to draw out water for drinking to make up the loss of sodium and other minerals.

Fig.8- Pierid butterflies puddling, Pong Dam (Himachal Pradesh)

The time from egg to emergence of butterfly is variable i.e. from three weeks to a year depending on the climate and vegetation. The life cycle is short during spring and monsoon, when leaves on plants sprout. It is long in regions of cold winter when old leaves become hard and their growth also ceases, with either caterpillars or chrysalids undergoing hibernation. Therefore, many species, particularly in the hills have only one or two broods but in many cases, there are more than two broods in the warmer regions.

Life span of adult butterfly: An adult butterfly lives for a day or less than a day. From egg to adult, the life span is usually three weeks and six weeks for smaller and larger butterflies, respectively. It may extend over a year for those hibernating and appearing again the following spring.

Enemies: Butterflies are delicate and fragile insects, therefore, falling victims to their enemies. These enemies are of two types: (a) with keen eyesight, e.g., birds and lizards. Therefore, for butterflies unpleasant taste and smell are useful and (b) without keen eyesight, e.g., insects and spiders, both having defective vision but can see at very close quarters. Therefore, for butterflies, armature of spines on larvae is useful rather than camouflage.

Both types of enemies are met with in all the four stages of butterflies that are equipped with protective devices.

Egg: The eggs are small in size and also modestly coloured. They have high rate of mortality as they fall victims to cockroaches and many are parasitised by minute ichneumons. Protection to eggs is achieved as they are laid in large number (up to about 500), in concealed

places, shaped to imitate galls and excrescences on leaves or gaurded by ants.

Larva: The larval or caterpillar is the critical stage in the life history of the butterfly for its survival. Birds and lizards eat large numbers of caterpillars followed by spiders, beetles, praying mantises, frogs and toads. Many ichneumon wasps, Chalcid wasps and Tachinid flies lay their eggs inside the body of the caterpillars of Bluebottles (*Graphium* spp.). Mason wasps carry caterpillars as food for their young-ones. Various structructures developed in the larvae provide protection to them, e.g. in Swallowtails, larva bears a forked process behind the head which is pushed out suddenly to frighten enemies. Pungent smell of Citronella and oil of Lavender in food plants of caterpillars of Swallowtails repel their enemies; a gland on 11th segment of the body (Lycaenids) produces sweet honey alluring ants for food and lycaenid in return getting protection, a gland on 12th segment of the body (*Curetis* Boisduval) is protrusible pillar-like organ used for scaring away enemies. The long horns on the head (Nymphalinae) can sweep the length of their bodies. The nymphalid larvae have spines which arch up when in danger. In Danaines, there are movable tentacles on 3rd and 12th, or 4th and 6th segments for brushing of insect enemies. The palatable larvae bear concealing markings, keeping out of sight and feeding at night. The protected species (unpleasant taste and smell) have larvae with poisonous properties and are brightly and strikingly coloured, and they feed during the day-time. The nymphalines, *viz.*, *Athyma* Westwood, *Moduza procris* (Cramer), *Euthalia* Huebner etc., have palatable larvae which bear markings resembling food-plants. Some larvae of Swallowtails resemble birds' droppings. Some larvae of lycaenids live and feed inside the fruits, and those of Skippers live in the cell formed of a curled-over leaf. Several distasteful caterpillars and those that are spined get additional protection by living in colonies. In this way, they increase the volume of the unpleasing smell in the colonies. The larvae of Moth Butterfly (*Liphyra brassolis* Westwood) build a construction like miniature tank among tree ants to live and feed on their grubs, and the larvae have such a tough skin that the ants cannot harm them.

Pupa: This is the safest stage in the development of butterfly. They are well concealed and harmonize with their surroundings in colour and shape, i.e. Mime (*Chilasa* Moore) resemble broken-off pieces of twig. Many pupae can wriggle, and others make noise by rubbing some of their segments together. The Skippers pupate in cells made of leaves or pieces of grass.

Final stage: The birds like Bee-eaters, Drongos, etc., are principal enemies followed by lizards which prey on butterflies of species settling on rocks or the ground. Dragonflies and Robberflies (Asilidae) seize and eat numbers of them, and some of them taken by stealth by Mantises; others get trapped in spiders web.

Protection: Adult is the most active stage in the life cycle of butterflies and protection is achieved in several ways.

Method of flight: A butterfly can either fly so fast that it is unlikely to be caught by any enemy e.g., Swallowtails and many nymphalids, or it may fly very slowly but erratic when disturbed so as to confuse the enemy, e.g. Map butterflies (*Cyrestis* Boisduval) and the Sailers (*Neptis* Fabricius). The fast flying butterflies are generally brightly coloured on upperside.

Markings and colouration: When a butterfly rests it keeps its wings closed vertically, exposing only undersides of hind wings and apical portion of fore wing which bear the protective markings. These markings harmonize with the surroundings of mixed vegetation [Large Tortoise Shell-*Nymphalis xanthomelas* (Dennis & Schiffermueller)]; sand of a dry river bed [Great Orange Tip- *Hebomoia glaucippe*) (Linnaeus)]; resemble leaves [Oakleaf Butterflies- *Kallima* Doubleday, Dry season form of Evening Browns- *Melanitis* Fabricius, Peacock Pansy- *Junonia almana* (Linnaeus)]. The shade-loving butterflies like Skippers, Amathusiids and Evening Browns are mostly brown or of a drab appearance. In some species, the males are conspicuous but the females are more somberly coloured. Some species of Browns and Amathusiids have eyes (ocelli) on upper or undersides to frighten off an enemy.

Habits: Many Skippers, Morphines and Satyrines only fly in the dusk of early morning or evening, thereby escaping the danger of

being eaten by birds. Most Browns skulk in the shade, or in dark jungles, or in among thick bushes.

Unpleasant taste or smell: Here the butterflies are protected by unpleasant taste and smell, and they fly slowly giving enemies enough time to recognise them. In conjunction with this, they bear warning colours i.e. bright combination, usually with red or yellow for easy recognition. They have usually tough bodies and the habit of feighening e.g., danaines.

Mimicry: A species displays mimicry when its butterflies whether distasteful to insectivorous animals or not, gain protection from attack by resembling a distasteful species. The former is called mimic and the latter one a model. When palatable butterflies of some species mimick the distasteful species in appearance, habits and methods of flight, then it is known as Batesian mimicry e.g., *Hypolimnas misppus* mimicking *Danaus chrysippus*. This mimicry may be found in both sexes or in female only. The resemblance is usually in respect of upperside of wings, but it may be on underside or even on both sides. On the other hand, when the butterflies of distasteful group find it to their advantage to resemble one another for making their recognition by possible enemies e.g., *Chilasa paradoxa telearchus* f. *danisepa* (Butler) mimicking *Euploea mulciber* (Cramer) then it is known as Mullerian mimicry.

Migration is a periodic or seasonal movement of an organism or a group from one habitat or location to another. It is a typically of relatively long distance from one area or climate to another. It generally affects the range of distribution of a population or individual. Migration is influenced by the factors like over-population causing a shortage of larval food and upsetting the balance life, to avoid severe cold weather and some instinctive behaviour.

In Himalaya, migrations take place from March to May towards north-west but towards south from August to November. In Palnis (South India), migrations fall into three seasons; main flight takes place towards south in October and November, during the wet weather.

Threats: The deterioration of natural surroundings with changes in climate and excessive collecting for trading are mainly responsible for the decline in number and population of species of butterflies and shrinkage in their areas/ranges.

The adult butterflies are killed for making decorative show pieces, wall hangings, greeting cards, ashtrays and such other fancy items. Their eggs, caterpillars and pupae are used for breeding purposes. For their short life history, they are suitably used in experiments for carrying out genetics studies. Some rare and brilliantly coloured butterflies are highly priced. Therefore, these butterflies are over collected for sale abroad also. Their trade amounts to world turn over of 100 million US dollars per year. The illegal trade of butterflies is prevalent in Western Himalaya (Himachal Pradesh, Ladakh and Uttarakhand), the Eastern Himalaya (Sikkim and in the north of West Bengal) and Western Ghats (Anonymous, 1996).

For the last 50-60 years there has been tremendous upward trend in the human population causing decrease in areas of vegetation due to deforestation for human requirement of land for agricultural practices, urbanization, industrialization, settlements, motorways, development of tourism for raising revenue, etc. Also, indiscriminate use of insecticides, pollution and monoculture, etc. are other factors contributing to the deterioration and shrinkage of the habitats of these delicate insects. Thus, with the increasing pace and intensity with which man is changing his environment, the loss of butterfly species is evident. In a normal way it takes millions of years for a species to disappear for ever, but for the last several years, their extinction/disappearance is disproportionate to the normal rate of extinction.

There are three aims for conservation of organisms: 1. Aesthetic, 2. Moral- if any person has the right to destroy deliberately a heritage that belongs to future generations and 3. Scientific and practical. The preservation of natural environments guarantees that ecological processes can continue to function. Butterflies are constituents of

natural environments and loss of any species is irreparable. The beautiful butterflies have aesthetic as well as scientific and practical value and, therefore, no person has the right to destroy them.

The three principal international bodies, *viz.*, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), International Union for Conservation of Nature and Natural Resources (IUCN) and World Wide Fund (WWF) are working for conservation of biodiversity at global level. Since 1984, Butterfly Specialist Group of Special Survival Commission is engaged in centralizing conservation data as well as advising on priorities for conservation attention.

The Government of India has afforded protection to 458 species of butterflies by legislation through the Indian Wildlife Protection Act (1972) with amendments from time to time under its three Schedules. Schedule-I (Part-IV) includes a number of 128 species/ subspecies of butterflies which has been reduced to 123 by Gupta and Mondal (2005). Persons offending this schedule are liable to very rigorous punishments. The Schedule-II (Part-II) includes 307 species/ subspecies of butterflies which are protected but with the controlled exploitation. The Schedule-IV (Part-II) includes 19 species/subspecies which are generally the common ones. When the population of a species/subspecies exceeds it may be transferred to next Schedule.

Till now, more than 580 protected areas have been declared as Biosphere Reserves, National parks and Wildlife Sanctuaries in India to provide protection to wildlife in nature. The establishment of Butterfly Garden at Science City in Kolakata (West Bengal), Butterfly Park at Bannerghatta National Park, Bangalore (Karnataka), Butterfly Safari Park, Themala (Kerala) and Butterfly Conservatory of Goa (Goa) are encouraging steps for *in situ* conservation of butterflies as well as amusement and fascination to the public. There are some proposals for creating such parks and gardens in various parts of the country. Mathew and Anto (2007) also made efforts for *in situ* propagation of different species of butterflies by establishing a prototype butterfly garden at Peechi (Kerala) which may have its utility in future

conservation programmes. The activities of butterfly clubs, release of stamps, calendars and posters depicting butterflies will create awareness in masses, about these magnificent insects.

Some of the important contributions to the Indian butterflies are by Marshall & De Niceville (1883), De Niceville (1886,1890), Bingham (1905,1907), Evans (1932, 1949), Piele (1937), Talbot (1939,1947), Wynter-Blyth (1957) and Cantlie (1962). Regional butterfly fauna has been dealt with by Goankar (1996), Gunathilagaraj *et al.* (1998) and Kunte (2000) from South India; Varshney and Chanda (1971), Radhakrishana *et al* (1989), Haribal (1992), Gupta and Shukla (1988), Gupta 1997a, 1997b, 2002, 2004) from Northeast India; Pajni *et al.* (2006) from North-west India; Kumar (2008) from Uttarakhand and Arora *et al.* (2009) from Himachal Pradesh. Kehimkar (2008) has also dealt with many species of India. Varshney (2007) treated some Indian butterflies in Hindi language. Varshney (1993, 1994, 1997) updated their nomenclature. Gupta and Mondal (2005) brought out a 'Red Data Book' on Indian butterflies.

One hundred Thirteen (113) species of butterflies representing all the subfamilies of four families of Papilinoidea and family Hesperiidae of Hesperioidea have been included. Many species show **infraspecific variation** with their **subspecies** (*Pachliopta aristolochiae*), **forms** (*Papilio demoleus demoleus* f. *demoleinus*), **sexual dimorphism** (*Hypolimnas misippus*), **polymorphic male and female** (*Papilio memnon agenor*) and **seasonal variation-** *Melanitis leda* (Linnaeus). Among the Indian butterflies, **largest** is *Troides minos* (Cramer) and **smallest** being *Freyeria putli* (Kollar); some are **beautiful-** *Papilio paris* Linnaeus, *Papilio crino* Fabricius, *Teinopalpus imperialis* Hope, *Bhutanitis lidderdalii* Atkinson, **ugly-** *Acraea issoria* (Huebner), *Liphyra brassolis* Westwood. Some are named after names of Indian **Gods and Goddesses-** *Papilio krishna* Moore, *Stichopthalma camadeva* (Westwood), *Aulocera saraswati* (Kollar), *Dodona* durga (Kollar). Some of them exhibit **protective resemblance-** *Kallima inachus* (Boisduval), whereas other show **mimicry** (*Batesian*)- *Danaus chrysippus* (Linnaeus), (*Mullerian*)- *Euploea core* (Cramer), displaying **zigzagging flight**: *Catopsilia florella* (Fabricius), *Catopsilia pyranthe* (Linnaeus), **fast flight**- *Virachola isocrates* (Fabricius), *Appias*

albina (Boisduval), *Pieris brassicae* (Linnaeus), *Papilio buddha* Westwood, **slow flight**-*Pachliopta aristolochiae* (Fabricius), *Terias hecabe* Linnaeus, *Cototis etrida* (Boisduval), *Jamides celeno* (Cramer), *Pseudozizeeria maha* (Kollar); **erratic flight**- *Belenois aurota* (Fabricius), *Colotis amata* (Fabricius), *Ixias pyrene* (Linnaeus); showing **metallic colours:** *Jamides alecto* Felder, *Thaumantis diores* Doubleday; some exhibiting physiological relationship **symbiosis-** *Spalgis epeus* (Westwood) (on cocids), *Liphyra brassolis* Westwood (Ant larvae); as **pests of vegetables-** *Euploea core* (Cramer), *Junonia orithya* (Linnaeus), *Cyrestis thyodamas* Boisduval; **pests of fruits:** *Papilio demoleus* Linnaeus, *Papilio helenus* Linnaeus, *Papilio memnon* Linnaeus, *Acraea violae* (Fabricius), *Euthalia aconthea* (Cramer), *Polyura athamus* (Drury), *Chilades lajus* (Cramer); **oil-seed plants:** *Ariadne ariadne* (Linnaeus); other **plants-** *Aulocera swaha* (Kollar), *Mycalasis evansii* Tytler, *Acytolepis puspa* (Horsefield), *Catochrysops strabo* (Fabricius), *Iambrix salsala* (Moore); **bamboos & palms:** *Zophoessa goalpara* Moore, *Zophoessa moelleri* (Elwes), .*Discophora sondaica* (Boisduval); visiting for nectar of **flowers:** *Cethosia biblis* (Drury), *Vindula erota* (Fabricius), *Parthenos sylvia* Cramer, **found in plains-** *Colotis danae* (Fabricius), **Peninsular India-** *Argyreus hyperbius* (Linnaeus), **high altitude**: *Bhutanitis lidderdalii* Atkinson, *Parnassius charltonius* Gray, *Colias fieldi* Menetries, **Widely distributed**- *Papilio demoleus* Linnaeus, *Papilio polytes* Linnaeus, *Melanitis leda* (Linnaeus), *Catopsilia pomona* Fabricius occurring rarely as **endangered**- *Pieris krueperi* Staudinger, *Bhutanitis lidderdalii* Atkinson, *Teinopalpus imperialis* Hope; with restricted distribution as **endemic-** *Chrysozephyrus kabrua* (Tytler), *Elymnias peali, Troides minos* (Cramer); restricted to **Western Ghats** - *Idea malabarica* (Moore), *Celaenorrhinus ruficornis* (Mabille) and **North-east part of India-** *Rhaphicera satricus* (Doubleday), *Zophoessa goalpara* Moore and *Zophoessa moelleri* (Elwes).

Evans (1949), Varshney (1993, 1994), Bridges (1988), have been followed for nomenclature of species of butterflies. Earlier names used by Bingham (1905-1907), Evans (!932), Talbot (1939,1947), Wynter-Blyth (1957) have also been given under each species / subspecies. Common name, diagnostic characters, morphological characters, variations (seasonal, subspecies, form), wing expanse, habits, habitat and ecology, food-plants and distribution for each species/subspecies

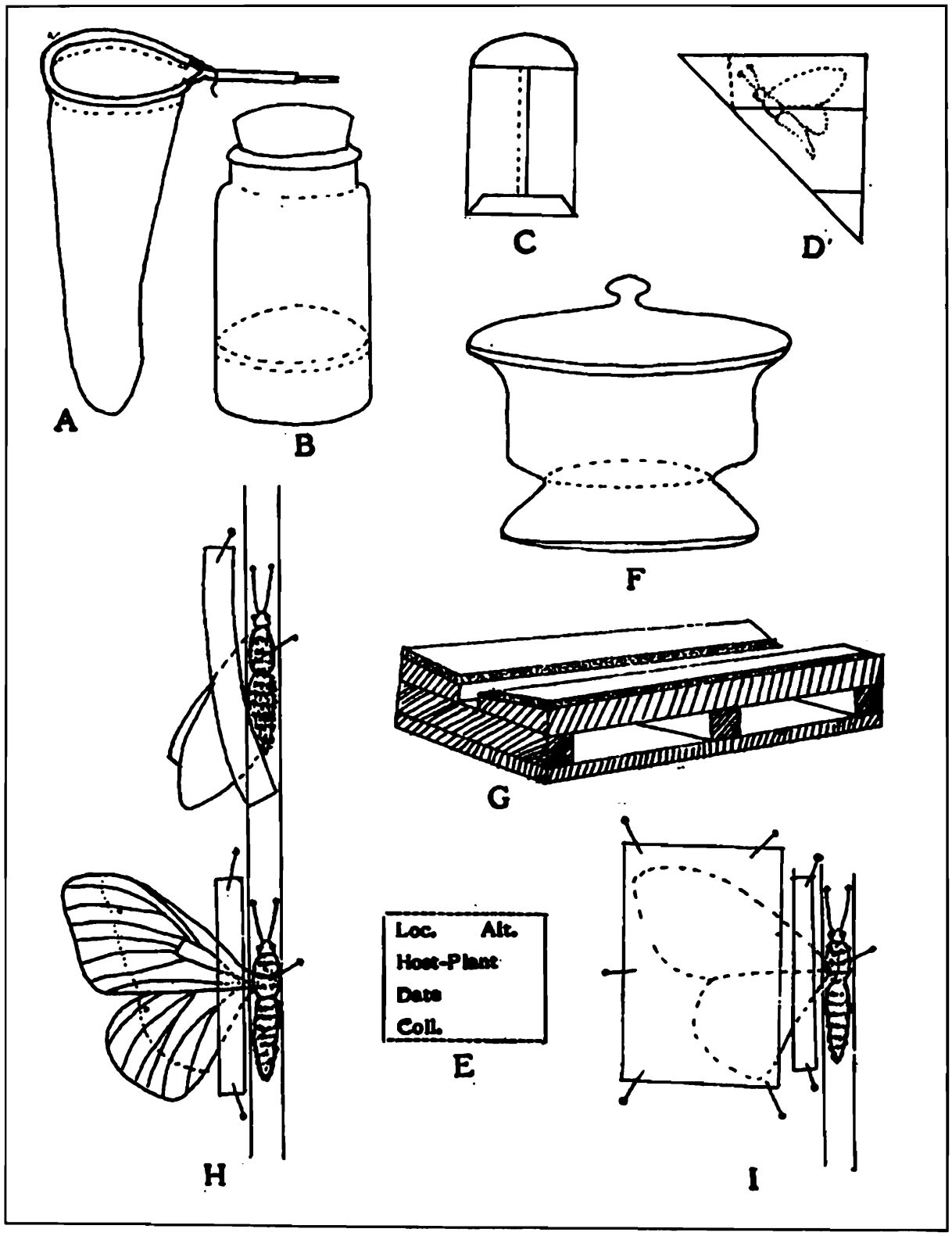
have been provided. The numerical notational system of venation has been followed for convenience. The brief life histories of some of the species have also been included. For status of species, Evans (1932), Talbot (1939, 1947) and Wynter-Blyth (1957) have been followed.

COLLECTING, SETTING, PINNING, STORAGE AND DISPLAY IN THE MUSEUM (Figs. A-I)

The information about habits and habitats of butterflies makes one to look for these insects in the field. Morphins inhabit thick forests avoiding light and open spaces. They only fly at dusk and dawn and possibly during night (hiding in dark places during day time). Acraeins are slow fliers and they proceed in a straight forward way keeping generally close to the ground and settle frequently either on flowers in exposed places on leaves or on the ends of twigs or sticks. Some of the nymphalids are fast fliers but almost all have one characteristic i.e. fond of basking in the sunshine. Riodinins live in denser forests skulking among undergrowth until evening but all are found at water.

The butterflies are collected using a butterfly net which should be placed over a resting insect settled on the ground. When in flight the effective way of catching butterflies is with upward sweep of net against rather than across or with the line offlight. For a butterfly settled on leaf an upward stroke of net is quite effective. As the butterfly is caught, net is turned with sharp twist of the wrist so that the bag folds over and prevents the insect to escape. After catching, butterfly is killed readily and easily by gathering the net around it, folding the wings back so that they are closed and finally giving its thorax a light but sharp nip between the thumb and fore-finger. While killing, care should be taken that the butterfly does not flutter about inside before collapsing otherwise scales covering the wings will be rubbed off and destroy the characteristic pattern of colour markings. After killing, the butterflies are kept in transparent or semitransparent rectangular or triangular envelops of the size depending on that of the specimens. A label bearing name of locality and collector and date of collection and other necessary information is placed along with the specimen. These envelops are kept in a suitable card box containing some cotton and

powdered naphthalene to avoid growth of fungus or damage to collection by ants, other insects etc. They are kept in sunlight to allow the specimens to dry.



Figs.A-I: A- Butterfly net; B- Killing Bottle, C-Rectangular insect envelope;, D-Triangular insect envelope; E- Locality label; F- Relaxing chamber; G- Insect setting board; H and I- Stages in setting and pinning.

In laboratory, butterflies are relaxed in a relaxing chamber, followed by pinning perpendicularly through the middle of thorax at point equidistant between the bases of fore wings. The wings are spread using paper strips. Antennae and abdomen are kept in proper position. A label bearing data is pinned below the specimen. The set and pinned butterflies are allowed to dry in a dessicator for 2-3 weeks depending on the climatic conditions. The dried specimens are transferred to air tight insect boxes which are already treated with benzene and containing powdered naphthalene. A label written legibly in black India ink is affixed with each specimen. The specimens of butterflies ready as mentioned above are studied under a binocular. Antennae, labial palpi, form of wing and markings on wings, legs etc. are easily made out. Wing expanse is measured in mm from middle of thorax to the apex of fore wing and making it double, whereas forewing length measured from base to apex of fore wing. Wing venation, one of the important characters, is studied by applying benzene or toluene underside of wings with a fine sable hair brush (No. '0 or 1') when scales lie flat and veins stand out. It is convenient to start from vein 2 (the lowest vein arising from the cell) to count upwards towards the costa. Study of these characters in accordance with literature (Evans 1932 ; Talbot, 1939, 1947; and Wynter-Blyth, 1957) and comparing the speciemen with that in reference collection will accomplish identification. A label bearing zoological name of species and the other bearing name of a person who identifies are affixed with the specimen. A species index card is prepared with information as given on different labels affixed with the specimen. A large number of identified specimens housed properly in drawers with glass covers, fitted in cabinets and species index cards build up a reference collection for guidance of future workers.

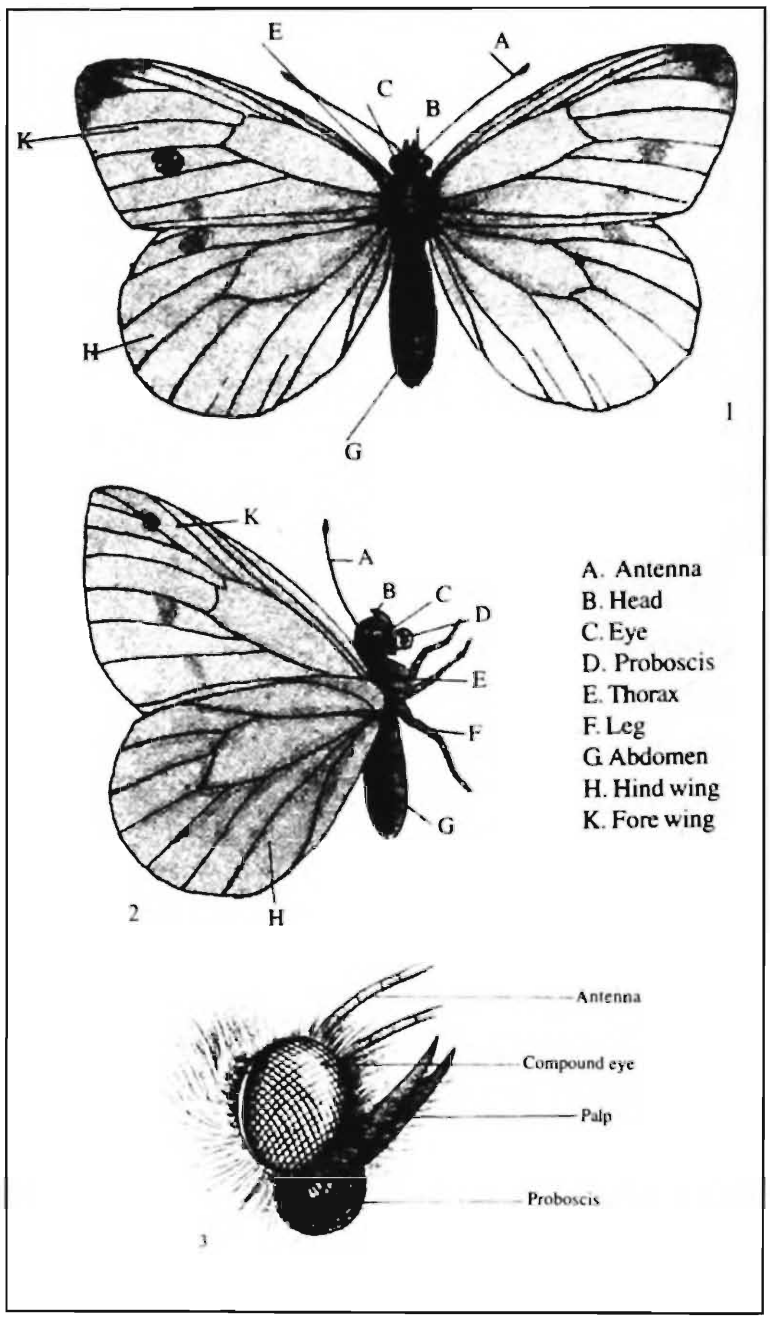
MORPHOLOGY
(Figs. 1-7)

The body of an adult butterfly consists of head, thorax and abdomen.

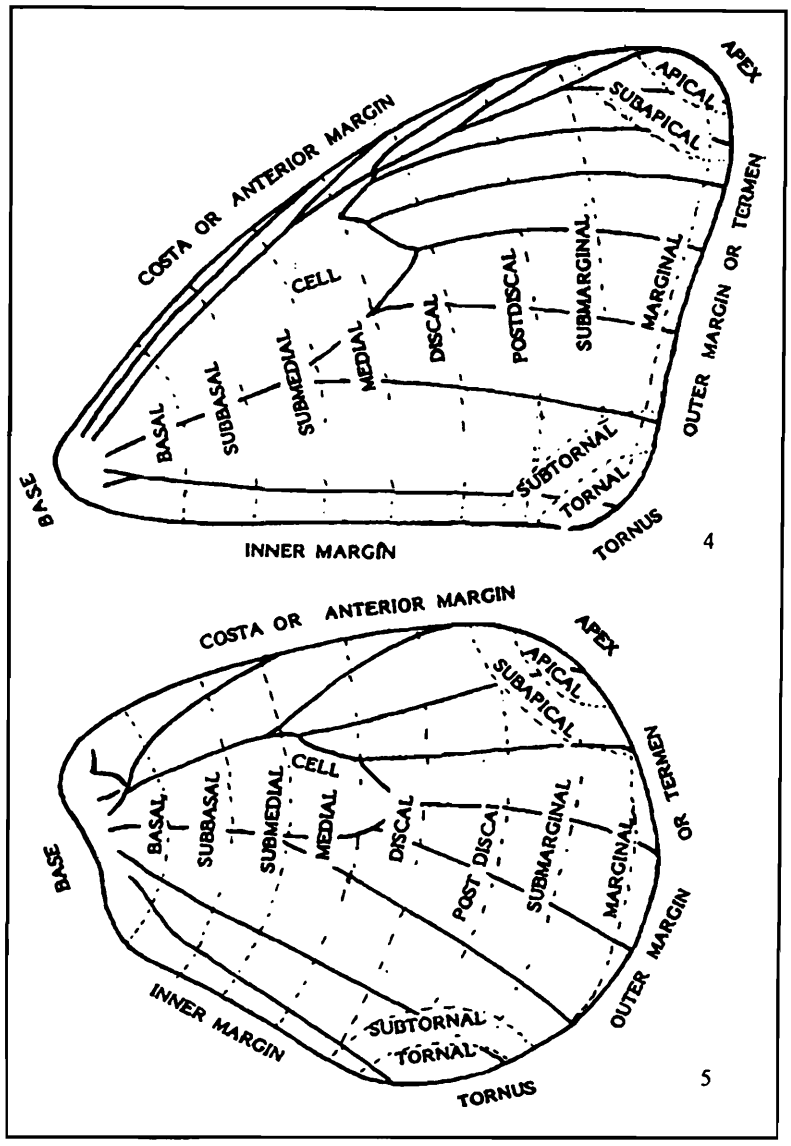
The head bears a pair of long segmented antennae situated in front of or between the compound eye and a proboscis (long coiled sucking tube) arising between the paired labial palpi. The shaft of antenna, thickens abruptly or gradually at the distal end forming a distinct club which may be grooved on its lower side. The club usually narrows towards tip which may be pointed or rounded. The compound eyes are large and immobile and may be smooth or hairy. During feeding, the butterfly extends its proboscis which otherwise remains coiled up. The labial palpi are three segmented which may be porrect or erect. The basal (first) segment being short while second and third segements vary in length, shape and scaling which an of taxonomic value.

The thorax is made up of three segments namely prothorax, mesothorax and metathorax, each carrying a pair of legs. The mesothorax and metathorax also bear a pair of forewings and hindwings respectively. Each leg consists of five segments, the coxa articulating with the thorax; trochanter is a very small segment interposed between the coxa and femur; tibia of medium length or long and armed with one or two pairs of movable tibial spurs, may be spiny or densely fringed with hair ; and lastly tarsus which is five segmented. The terminal or fifth segment ends in a pair of claws beneath which is usually a small pad called the pulvillus. Adjacent to each claw is a brush-like attachment known as the paronychium. The legs are of major importance in the classification of butterflies. The forelegs are short, slender and not fully developed as in subfamily Nymphalinae.

The shape of the wing is very variable. The upper or anteriormargin is known as the costa and lower or posterior edge is the inner margin or dorsum, the proximal part of wing next to thorax is the base and margin remote from the thorax is distal margin, outer margin or termen. The anterior tip of the wing is called the apex and that of inner margin is known as the tornus. The prefix sub-implies "near to", and the lines or markings on wings may be decribed as basal, sub-basal, medial or discal, postmedian or post discal, submarginal or subterminal, marginal or terminal, apical, subapical, tornal, subtornal etc. Along the outer margin is a regular fringe or the cilia composed of closely-packed scales in a double row. The markings on wings consist of bands, lines, spots, patches and rings of varied form. The wings are membranous with veins running longitudinally from base to the wing margin or termen. There is a comparatively wide and approximately triangular space called discal or discoidal cell or simply the cell which is usually closed at the outer

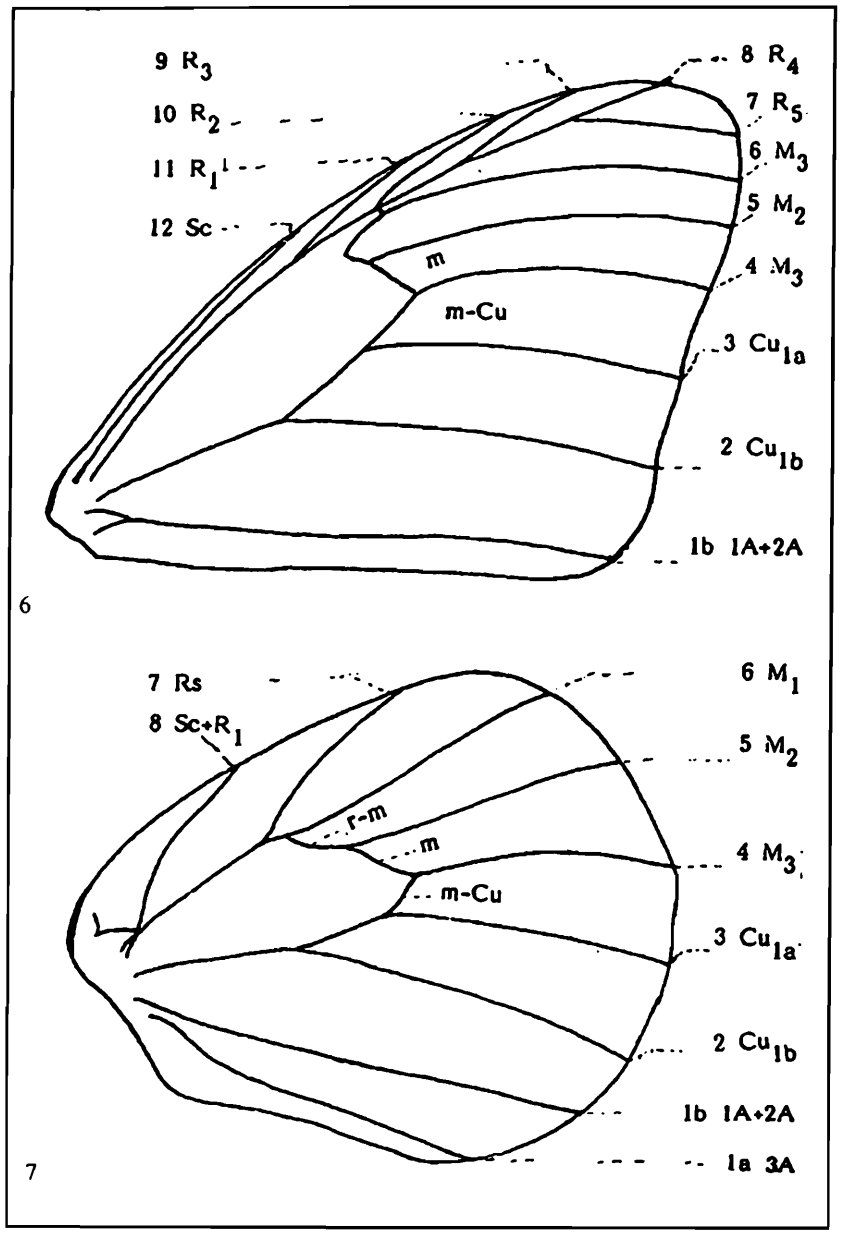


Figs.1-3: Morphology, 1- Adult butterfly (Upperside), 2- Adult butterfly (Underside), 3-Head of a butterfly



Figs.4-5: Subdivisional regions of the wings: 4- Fore wing, 5- Hind wing

end by short transverse veinlets known as discoidal or discocellular veins. The portion of the wing surface surrounded by the discoidals is usually termed as the discal area. Usually ten veins arise from the cell in fore wing and six in hind wing. Sometimes one or more veins are absent especially on the fore wing. There are different systems of notation to describe the venation, namely Numerical notation, Comstock-Needham notation, Rothschild & Jordan notation etc. In fore wing, veins known as 1a, 1b, 2, 3, 4, 5, 6, 7, 8,9, 10,11 and 12 in numerical notational system are mentioned as veins 3A, 2A+1A, Cu_{1b}, Cu_{1a}, M_3, M_2, M_1, R_5, R_4, R_3, R_2, R_1 and Sc in Comstock- Needham notation. Similarly, in hind wing, veins referred as 1a, 1b, 2, 3, 4, 5, 6, 7 and 8 in Numerical notational are called 3A, 2A+1A, Cu_{1b}, Cu_{1a}, M_3, M_2, M_1, Rs and R_1+Sc in Comstock-Needham notation. The space between the two veins is interspace or area and is known by the lower vein e.g., in fore wing space between veins 1a-1b, 1b-2, 2-3, 3-4, 4-5, 5-6, 6-7, 7-8, 8-9, -10, 10-11 and 11-12 are called area 1a, 1b, 2, 3, 4, 5, 6, 7, 8, 9, 10 and11 respectively. Accordingly, in hind wing, space between veins 1a-1b, 1b-2, 2-3, 3-4, 4-5, 5-6, 6-7 and 7-8 is known as area 1a, 1b, 2, 3, 4, 5, 6 and 7 respectively. In Numerical notation the veins are numbered from the dorsum or inner margin to the costa so that veins run from la or lb to vein 12 in fore wing and veins la to 8 in hind wing. Veins 2-11 in fore



Figs.6-7: Venation in wings, 6- Fore wing, 7- Hind wing

wing and 2-7 in hind wing arise from the margin of the cell (or veins arising from the cell) while remaining veins originate from the wing bases.

The upper margin and lower margin of the cell are called radius and cubitus, respectively. In this case, radius runs from base to origin of vein 7 (or vein 6, when veins 6 and 7 stalked) whereas cubitus extends from base to origin of vein 4. Lower discocellular vein is the cross vein joining veins 4 and 5, middle discocellular vein is cross vein joining veins 5 and 6 while upper discocellular vein is cross vein joining veins 6 and 7 and is often obsolete. In some cases, in hind wing, a small vein or a trace of such a vein arises from near base of vein 8 and it is called precostal or humeral vein or spur.

The abdomen consists of ten segments and 8th to 10th segements contain male genital apparatus in male and female genital organs in female.

CLASSIFICATION OF BUTTERFLIES

The superfamily Papilionoidea includes true butterflies and Hesperioidea includes skippers. The Hesperiids are distinguished from true butterflies by having antennal club hooked. The superfamily Papilionoidea includes four families, *viz.* Papilionidae, Pieridae, Nymphalidae and Lycaenidae; whereas the superfamily Hesperioidea includes two families, viz. Hesperiidae and Megathymidae of which only the former is represented in India.

KEY TO SEPARATION OF FAMILIES OF BUTTERFLIES

1. Antennae approximated at the base. Fore wing with two or more veins coincident or forked beyond the cell 2

   Antennae widely separated at the base. Fore wing and hind wing with all the veins present and arising separately from the cell or base of the wing.....Hesperiidae

2. Hind wing with a precostal vein present (except in a few Pieridae) 3

   Hind wing without a precostal vein.....Lycaenidae

3. Forelegs with tarsi perfect in both sexes.....4

   Forelegs with tarsi imperfect and brush-like in one or both sexes.....Nymphalidae

4. Hind wing with inner margin channeled to receive the abdomen; modified and upturned; vein 1a usually absent .....Papilionidae

   Hind wing with inner margin not channelled to receive the abdomen; neither modified nor upturned; vein 1a always present .....Pieridae

SUPERFAMILY PAPILIONOIDEA
FAMILY PAPILIONIDAE

Antennae comparatively short and usually with a distinct club; proboscis well developed; palpi short and appressed to frons (except *Teinopalpus* where they project); fore legs fully developed. Fore tibia with spur on the innerside, hind tibia with middle spur, claws simple and rarely with toothed, paronychium and pulvillus absent. Cell closed in both sexes. Fore wing with all veins, in addition vein 1a ending on the inner margin, a short transverse vein also present near the base of wing between cell and vein 1b (with few exceptions), veins 7 and 8 stalked, vein 2 arising before middle of cell, four veins arising from the outer lower edge of the cell. Hind wing usually with a tail at vein 4 which may be slender or broad and spatulate, inner margin of hind wing being frequently folded over and within the fold, in male bearing a patch of specialized scales or scent scales (androconia); vein 1b absent, the basal cell and precostal vein present.

SUBFAMILY PARNASSINAE

Head small; frons rough-hairy; eyes large; palpi short, acute and not projecting above the head. Antennae short, more or less club shaped, the shaft being often ringed with black and white. Thorax normal, densely hairy. Wings broad and rounded, white rarely yellow, distally with black spots and grey or blackish bands, hind wing often with red-spotted ocelli. Much variation in colour and pattern. fore wing without a median spur (small transverse vein between 1b and cell), vein 9 absent; hind wing with basal cell almost obsolete, without precostal spur. Abdomen strongly hairy in the male, in the female sparsely hairy or with scarcely any hairs; a horny pouch at the apex below (*Parnassius*).

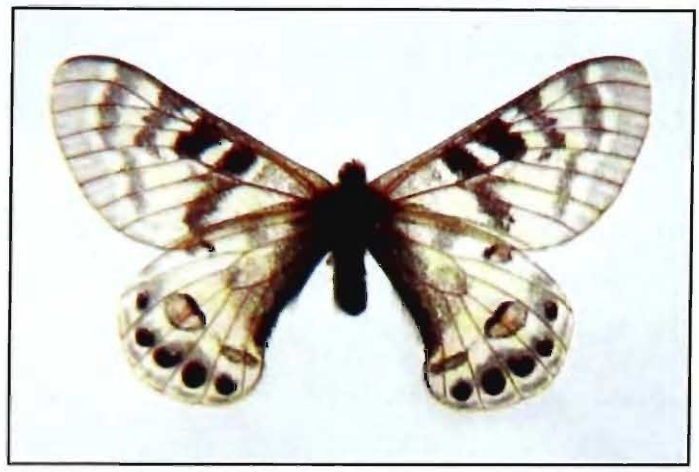
1. *Parnassius charltonius* Gray, 1852

Parnassius charltonius Gray, 1852.
Parnassius charltonius Gray: Talbot, 1939; Varshney, 1993.

Common name: Regal Apollo.

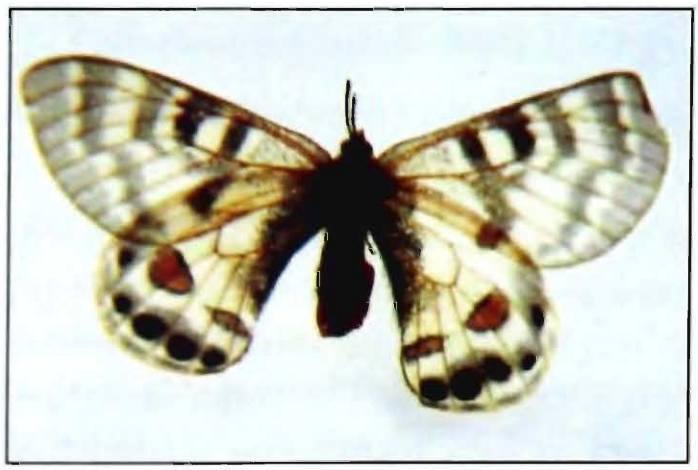
Diagnostic characters: Upperside of hind wing with a large red spot, usually white centred, between veins 4 and 6, also a red or black basal bar in areas 1 and 2.

Morphological characters:



Parnassius charltonius charltonius- Male (Upperside)

Male- *Upperside* creamy white. Fore wing dusted with black scales at base and along costal margin narrowly; four broad transverse black bands below the costa- first in middle of cell and continued to the inner margin, second at end of cell, third discal band placed obliquely from costa to vein 5 and then narrowly following inwards along the lower margin of cell upto vein 3 and meeting the first band below the cell, fourth postdiscal band bent slightly inwards at vein 5 and not reaching tornus; and followed by a broad subhyaline marginal border narrowing posteriorly. Hind wing with a red or black basal bar above the anal angle in areas 1 and 2, a very large usually white centred red ocellus extending from vein 4 to vein 6, a small red or black spot present in middle of area 7; a complete row of blue centred black



Parnassius charltonius charltonius- Female (Upperside)

submarginal spots on a dark ground followed by a narrow black marginal line more or less interrupted at the veins. **Female** – *Upperside* markings more diaphanous than in male; pouch (sphragis) heliciform/ limaciform being rolled upon itself and furnished with a wide and longitudinal shallow groove. *Underside* like that of upperside but with a glassy appearance.

Variation: The species varies in the width of black markings and in the size of the red ocelli on the hind wing.

There are three subspecies in India:-

i) *P. charltonius charltonius* Gray – Upperside of fore wing with a postdiscal band slightly bent inwards at vein 5. Kumaon, Ladak.

ii) *P. charltonius deckerti* Verity - Upperside pale white; fore wing with postdiscal band more distinctly interrupted at vein 5 than in nominate subspecies. Kashmir.

iii) *P. charltonius bryki* Haude – Smaller than *deckerti* and *charltonius*, the costal part of post discal band having arcs more rounded than pointed. Spiti (Nilang Pass, Shipki Pass, Tauling Pass, Tum-Tum-Thang Mountains).

Wing expanse: Male, female 74-96mm.

Habits: It is one of the finest butterflies of the genus *Parnassius*. It is also an high altitude butterfly, flying on mountain slopes near glaciers. It rests on bare peaks in the Himalaya. The female descends to a lower elevations than the male. It visits flowers for honey.

Habitat and ecology: It appears during July-August at higher elevations of 3650-5000m.

Life history: The fertilized female shows a characteristic horny pouch (sphragis) at the end of the abdomen. The larva is cylindrical, unusually tapering at both ends. It is black and variously ornamented and its body covered with short hairy warts. The pupa is obtuse, thick, more or less cylindrical, light or dark brown and dusted with glaucous blue. The pupation takes place underground.

Food-plants: Flowers (Saxifragaceae).

Distribution: India: Himachal Pradesh , Jammu & Kashmir, Uttarakhand. Elsewhere: Pakistan, Turkestan to the North West Himalaya.

Status: Not common. The nominate subspecies is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY ZERYNTHINAE

Antennae rather short; palpi long and strongly projecting. Fore wing a strong median spur. Hind wing with a basal cell large, elongate, longer than broad, and a precostal vein directed basad,. tailed at vein 4 or with toothed margin.

Larva short and thick, with a short, fleshy fork behind the head. Pupa slender.

2. *Bhutanitis lidderdalii lidderdalii* Atkinson

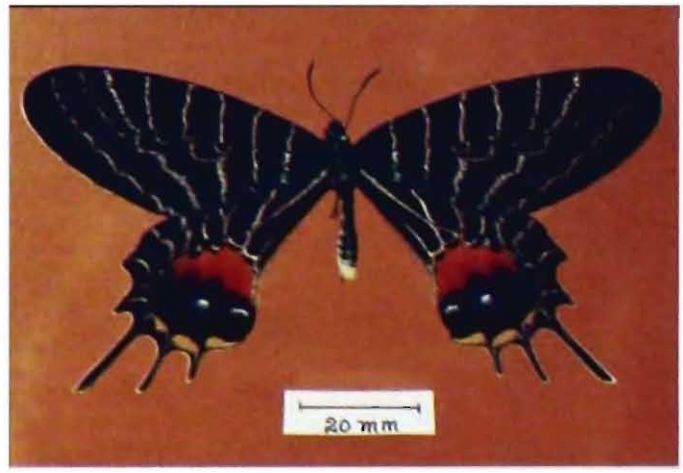
Bhutanitis lidderdalei Atkinson, 1873.
Armandia lidderdali (Atkinson): Bingham, 1907
Armandia lidderdalei (Atkinson):Evans, 1932; Talbot, 1939; Wynter-Blyth, 1957
Armandia lidderdalei lidderdalei (Atkinson): Talbot, 1939.
Bhutanitis lidderdalii Atkinson : Varshney, 1993.

Common name: Bhutan Glory.

Diagnostic characters: Upperside of fore wing crossed by eight slender yellowish white lines. Hind wing precostal cell elongate and longer than broad.

Morphological characters: **Male-** *Upperside* dull black; fore wing oblong with outer margin oblique, both apex and tornus rounded, its surface crossed by eight ochraceous white lines continued in a series of more or less diffused curves to the inner margin except that the 4th and 5th terminating on vein 3 and 7th ending on vein 4, all the lines except those crossing the cell, formed of short curves separated

by the veins. Hind wing with similar ochraceous white lines more or less in continuation of those on the fore wing, an additional broad line along vein 1b and the vein 2, the latter two lines not reaching beyond base of vein 4, a large tornal patch with the proximal half scarlet and the distal half velvety black, followed by a broad submarginal bright yellow lunules in areas 1 to 4, distal half of posterior patch in areas 1 and 2 with ill defined superposed white spots; the tail at vein 4 being longer than tails at veins 2, 3 and 5. *Underside* as on upperside but all the markings broader; hind wing base of cell crossed by a short ochraceous white bar and the edges of the precostal cell with narrow lines of the same colour. **Female**- as male but usually larger; hind wing basal half narrow and broader beyond and inner margin emarginate.



Bhutanitis lidderdalii lidderdalii- Female (Upperside)

Variation: The individuals of broods of May-June and August-October show variation in colouration and wing markings.

Only the nominate subspecies, *B. lidderdalii lidderdalii* Atkinson occurs in India.

Wing expanse : Male, female 90-124 mm.

Habits : It is one of the very beautiful Indian butterflies. It has historical importance as three persons lost their lives for collecting its individuals. Its flight is weak. It drifts about among the tree tops, rarely descending to the ground. It also visits flowers. During rain it alights on a leaf and pushes its fore wings over the hind wings to conceal its bright colours. It gives out a pleasant odour which remains some days even after the death.

Habitat and ecology: The butterfly occurs at elevations of 1500-2750m. It has two broods- one in May-June and the other in August-October.

Life history: The oviposition takes place during September-October. The female lays eggs in group under the leaves of its food plants.The eggs are yellow and very small in size. The larva is black with numerous verrucae on trunk. The pupation takes place in fallen leaves.

Food-plants: *Aristolochia griffithii* (a white flowering plant), *Aristolochia* spp., nectar from Polygonaceae and Umbelliferae.

Distribution: India: Manipur, Nagaland. Elsewhere: Bhutan, Myanmar.

Status : Rare. The nominate subspecies is given protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY PAPILIONINAE

Wings variable in shape. Fore wing with 12 veins, in addition a short internal vein, vein 1a invariably ending on the dorsal margin, a median spur and vein 1b present; hind wing with a small basal cell and a precostal vein directed distad.

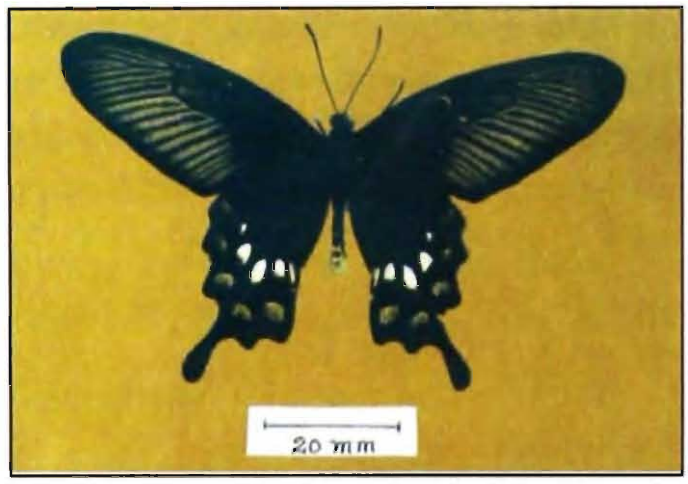
3. *Pachliopta aristolochiae* (Fabricius)

Papilio aristrolochiae Fabricius, 1775.
Papilio aristrolochiae Fabricius: Bingham, 1907.
Tros aristolochiae (Fabricius): Evans, 1932; Wynter-Blyth, 1957.
Polydorus aristolochiae (Fabricius): Talbot, 1939.
Pachliopta aristolochiae (Fabricius): Corbet & Pendlebury, 1992; Varshney, 1993.

Common name: Common Rose.

Diagnostic characters: Mostly black and wings elongated, hind wing tailed and with elongate white spots around lower end of cell. Underside crimson and black.

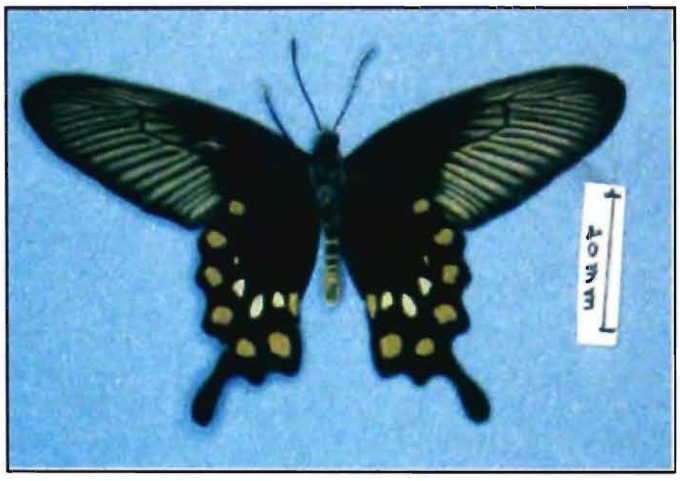
Morphological characters: **Male** - *Upperside* black; fore wing discal area paler with black fold stripes and well marked pale vein stripes,



Pachliopta aristolochiae aristolochiae- Female (upperside)

hind wing usually with five elongate white spots around the lower end of the cell, a marginal series of dirty-red lunules, the white spots and dirty red crescents shaded with black, tail spatulate and black.*Underside* of fore wing with brown fold stripes and hind wing with a series of white spots around the cell but spot being crimson on the inner margin followed by a row of submarginal crimson spots. **Female** - as male, but usually with broader wings with paler markings and larger spots.

Variation: The species shows variation in size and number of elongate white spots in hind wing. Some males are markedly smaller.



Pachliopta aristolochiae aristolochiae- Female (Underside)

There are five subspecies in India.

i) P. aristolochiae aristolochiae (Fabricius)- Upperside hind wing without or with rarely white spot in cell, white spots remote from cell and incomplete; underside hind wing with spot in areal usually red. Widely distributed in India.

f. *aristolochiae* (Fabricius)- Discal spots in hind wing reduced proximally and, thus, remote from the cell.

f. *diphilus* (Esper) - Discal spots in hind wing placed close to the cell.

ii) *P. aristolochiae camorta* (Moore) –Upperside hind wing with only post cellular spots in areas 1b and 2, and spots obscure in areas 3 and 4. Central group of Nicobar Islands.

iii) *P. aristolochiae goniopeltis* (Rothschild)- Upperside hind wing with discal spots often red edged and underside hind wing having discal spots in area 1 often red. Andaman Islands. Myanmar, South China, Thailand.

iv) *P. aristolochiae kondulana* (Fabricius)- Upperside hind wing with post cellular spots in areas in areas 2-4 or 5 being very small except for spot in area 4. South Nicobar Islands.

v) *P. aristolochiae sawi* (Evans)- Upperside hind wing with post cellular spots in areas 2-5 half the size of those in *goniopeltis*. Car Nicobar.

Wing expanse: Male, female 80-110 mm.

Habits: The flight of the butterfly, when not alarmed, is slow, direct and on the level. It visits flowers particularly in the early morning. It roosts some-times in large companies. The scent from bodies of fresh specimens is very unpleasant (because of Aristolochic acid in food plants). Its female is mimicked by the female of *Paplio polytes*. This species is migratory.

Habitat and ecology: This species is very common all over the plains and at low elevations, paticularly during and after the monsoon. It is found up to elevations of 2450m in South India, 1550m in North-east India but not found usually above 915m in the North-west India.

Life history : The female lays eggs singly either on top or on underside of the leaf or any other part of the plant. The egg is flat, dome shaped and orange-red in colour. The larva is black with red fleshy short tubercles without rounded lobes. The full grown larva measures 30 mm in length and 8 mm in breadth. The pupa is brown with various shades of brown and pink markings. Its abdomen is with four pairs of rounded lobes and thorax also with lateral rounded lobes. It is attached to the leaf by tail and a body girdle.

Food-plants: *Aristolochia bracteolata, A. indica* (Birthwort), *A. tagala, Dioscorea wallichii, Thottea siliquosa.*

Distribution: India: Andaman & Nicobar Islands, widely distributed in India. Elsewhere: Myanmar, South China, Thailand.

Status: Very common.

4. *Pachliopta hector* (Linnaeus)

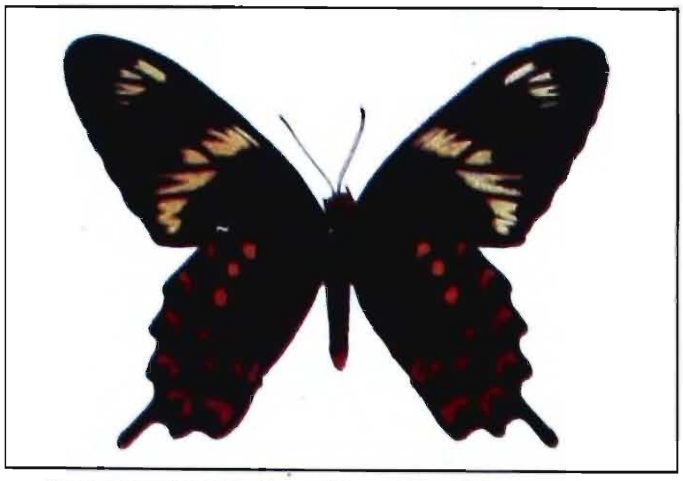
Papilio hector Linnaeus, 1758.
Papilio hector Linnaeus: Bingham, 1907.
Tros hector (Linnaeus): Evans, 1932.
Polydorus hector (Linnaeus): Talbot, 1939.
Pachliopta hector (Linnaeus): Corbet & Pendlebury, 1992; Varshney, 1993.

Common name: Crimson Rose.

Diagnostic characters: Upperside black; fore wing with two white bands and hind wing bearing numerous bright red spots and tail of even width at end of vein 4.

Pachliopta hector- Male (Upperside)

Morphological characters: **Male-** *Upperside* black; fore wing with a discal broad white interrupted band from the subcostal vein extending obliquely to the tornus and another similar subapical band, both bands having detached irregularly indented broad streaks in the interspaces; hind wing with a discal posteriorly strongly curved series of seven crimson spots followed by a submarginal series of crimson



Pachliopta hector- Female (Upperside)

lunuls. Abdomen with anterior half black and apical half red. **Female-** *upperside* as in male but the markings duller, hind wing with discal and submarginal series of spots and lunules of which the anterior ones may be pale crimson and sometimes these may be almost white; abdomen with black colour extending towards apex.

Variation: The species shows variation in wing markings from crimson to pale crimson or almost white.

Wing expanse: Male, female 88-120 mm.

Habits: This is one of the beautiful and migratory butterflies in India. It is slow flier and is very common in the plains. It is often found on low flowering bushes and plants, especially *Lantana*. It roosts in great numbers together.

Habitat and ecology: It is found both in jungle and in open country at low elevations. During dry weather it may occur even at elevations of 2400m in South India.

Life history : The head is round, black and shiny, somewhat hidden under 2nd segment. The full grown larva is rich black brown. It measures 45mm in length and 10 mm in breadth. The pupa is light brown and marked dorsally with white. It is 30mm in length and 10 mm in breadth.

Food-plants: *Aristolochia bracteata, A. indica, A. krisagathra, A. tagala, Lantana* sp. and *Thottea siliquosa.*

Distribution: India: Andaman & Nicobar Islands, West Bengal, Orissa, South India, West Bengal. Elsewhere: Bangladesh, Sri Lanka.

Status : Least Concern (Gupta & Mondal, 2005). This species is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

5. *Troides minos* (Cramer)

Papilio minos Cramer, 1779.
Troides helena minos (Cramer): Evans,1932; Talbot, 1939.
Troides helena (Linnaeus): Wynter Blyth, 1957.
Troides minos (Cramer): Varshney, 1993; Gunathilagaraj, 1999

Common name : Southern Birdwing.

Diagnostic characters: Upperside fore wing of male black with a few grey white vein stripes and hind wing golden with black borders and veins; female fore wing with grey white vein stripes and hind wing with a discal row of large triangular black spots.

Morphological characters: **Male**- *Upperside* of fore wing glossy black, veins 2-6 edged with white but veins 2-4 prominently white striped than others; these stripes continued to cell and united there; hind wing golden with inner area black as far as the cell, veins black and a broad outer marginal black border having six spots in areas 2-7 and largest spot being in area 3. **Female** – *upperside* of fore wing with prominent grey white vein stripes extending to the cell and united there, the distal half of the cell surrounded with white and also white inside the cell; hind wing golden with black inner area and a row of discal large triangular or inwardly cone shaped black spots separated by yellow from the broad black border.

Troides minos- Male (Upperside)

Troides minos- Female (Upperside)

Variation: The species shows variation in the vein white stripes and size of black spots on hind wing.

Wing expanse: Male, female 140-190 mm.

Habits: This is the largest of all the Indian butterflies. It has a slow flight and flies high over the trees. Soon after the sunrise, it starts flyng early in the morning. The display of its leisurly flight is

unpalatable to its predatory birds.This distastefulness is due to poisonous plants of Aristolochiaceae eaten by the larva.

Troides minos- Female (Underside)

Habitat and ecology: It is common during before and after monsoons rather than in summer. Both sexes are equally common. It is found in low land evergreen forests near the coasts to mixed deciduous forests, dry scrub and agricultural fields. It ascends about 2000m in Peninsular India. It also inhabits gardens and orchards.

Life history: The egg is reddish. The larva is dark brown. Then full grown larva is 90 mm in length,15 mm in greatest width and 14 mm in greatest height.The length of the longest tubercle is14 mm. Each of the segments 3 to 14 is with a subdorsal fleshy conically produced tubercle. A row of shorter spiracular tubercles is present on 2 to 14 segments. It is parasitized by a small Braconid which lays many eggs. The pupa is 50 mm in length and 20-25 mm in breadth and 15 mm in height. It is pink-brown or green, with saddle and back of abdomen orange or yellow, the whole surface reticulated with brown. When touched, the pupa makes hissing sound 'pha pha' loudly which is produced by the friction of the abdominal segments against each other.

Food plants : *Aristolochia indica* (Indian Birthwort), *A. tagala, Ixora, Lantana, Mussaenda* and *Thottea siliquosa.*

Distribution: Maharashtra, South India.

Status : Not rare.

6. *Chilasa paradoxa telearchus* (Hewitson)

Papilio telearchus Hewitson, 1852.
Papilio paradoxus telearchus (Hewitson): Bingham, 1907.
Chilasa paradoxa telearchus (Hewitson): Evans, 1932; Talbot, 1939.
Chilasa paradoxa (Zinken-Sommer): Varshney, 1993.

Common name: Great Blue Mime.

Diagnostic characters: Upperside dark brown; fore wing shot with blue, hind wing in female with whitish streaks between veins and in cell but these streaks absent in male.

Morphological characters: **Male-** *Upperside* dark brown; fore wing one- third basally dark brown and beyond shot with blue, stripes between veins whitish-blue, followed by a submarginal series of bluish white spots, the series being curved inwards towards costa; hind wing dark brown, usually without any marking or when a submarginal series of small white spots present, then the spots increasing in size anteriorly. *Underside* chocolate brown; fore wing with a faint whitish spot near apex of cell, postdiscal indistinct white spots, two in area1, one each in areas 2 and 3 and one below costa and a submarginal series of white spots curved towards costa as on upperside; hind wing with a submarginal series of white spots curved towards costa as on fore wing. **Female-** *upperside* of fore wing basal half dull brown and apical half brown shot with brilliant blue, an elongate white spot near apex of cell, white streaks- one along inner margin, two in area 1a, one each in areas 2 and 3, a postdiscal and a submarginal series of white spots, both series curved inwards towards costa and having two spots each in area1b, these markings larger and whiter than in male; hind wing brown with white streaks between veins and in the cell and a submarginal series of outwardly emarginate white spots. *Underside* pale

Chilasa paradoxa telearchus- Male (Upperside)

Chilasa paradoxa telearchus- Male (Underside)

dull brown with markings larger and diffused; fore wing may have additional white streaks in the cell and between the veins.

Variation: The subspecies shows variation in colouration and size and extent of wing markings.

Its following f. *danisepa* Butler occurs in India.

f. *danisepa* (Butler): Differs from typical male form by the upperside of fore wing with a large white spot at end of cell and two spots below the cell; hind wing with basal half white and veins black. Female is like male except that blue gloss on both wings is restricted and ground colour pale brown with white markings complete and broader.

Wing expanse: Male, female 120-150 mm.

Habits : The butterfly is fond of settling on damp patches. It exhibits Batesian Mimicry as it mimicks *Euploea mulciber* in both sexes and also in flight and only when alarmed, it flies off great speed like a true *Papilio*. The f. *danisepa* Butler resembles *Euploea rhadamanthus*.

Habitat and ecology: The butterfly inhabits forests at low elevations.

Life history: The larva is velvety black or green, with fleshy spines and round red lateral spots. The pupa resembles a broken-off twig and is of green or brown colour, like that of the twig to which it is fastened.

Food-plants: Laurels (Lauraceae).

Distrbution: India: Assam. Elsewhere: Myanmar, Thailand, Vietnam (Tonkin).

Status : Rare, especially the female. The f. *danisepa* Butler is rarer than subspecies *telearchus* (Hewitson). This subspecies is provided protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

7. *Papilio buddha* Westwood,1872

Papilio buddha Westwood, 1872.

Papilio buddha Westwood: Varshney, 1993.

Common name: Malabar Banded Peacock.

Diagnostic characters: Upperside black, with green band broad and broadly entering the cells in both wings, hind wing with green discal area large, circular and entering the cell.

Papilio buddha- Male (Upperside)

Morphological characters: **Male-** *Upperside* of both wings with basal areas dusted with green and distal marginal areas black; fore wing with a broad bluish green, discal band narrowing towards costa and broadest at the inner margin, occupying a little less than half of apical area in the cell, outer margin of discal band irregular, no scent-streaks; hind wing with the broad bluish green, discal band extending far into one-third of apical area in the cell, a yellow spot above the discal band at the costal margin and a similar spot smaller or obsolete at the anal angle; tail black. *Underside* of fore wing with postdiscal grey band broader towards costa and narrower towards inner margin; hind wing with a pale outer marginal border bearing a row of yellow submarginal spots, the latter distally bordered with black and proximally with bluish white. **Female-** like that of male but the hind wing with a second yellow outwardly emarginate spot above the discal band but behind the subcostal vein.

Papilio buddha-Male (Underside)

Variation: This species shows variation in the width of discal band on both wings and size and shape of orange-yellow spots on hind wing.

Wing expanse: Male, female 90-100 mm.

Habits: This is one of the exteremly beautiful Indian butterflies and gets its name after the Indian God "Buddha" The male flies fast round the tops of trees. Unlike male, the female is seldom seen though it is in majority by breeding which is accounted for its not flying during the hot, sunshine hours.

Habitat and ecology: The butterfly is found in the wet jungles of Western Ghats, common in Coorg and moderately common in Malabar during May-September. It occurs upto elevations of 765m and not uncommon on the western slopes of Nilgiris.

Life history: The egg is 1.3 mm in diameter. At first, it is pale lemon and soon changing to rusty markings. The young larva is livid greenish-yellow with a very dark olive-green dorsal band, and a similarly-coloured broad lateral band. In later stages it becomes darker green and assumes grey, white, and yellow markings. The full grown larva measures 42 mm in length and 10 mm in breadth. The osmeterium is reddish. The pupa is of 32 mm length and 10 mm breadth at the middle. It is almost uniformly curved, without a thoracic horn and the head produced in two long protuberances.

Food-plants: *Clerodendron, Lantana* and *Zanthoxylum limonella* (Badrang, Bazinali).

Distribution: India: Peninsular India.

Status : Local and generally rare. This species is given protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

8. *Papilio crino* Fabricius, 1793

Papilio crino Fabricius, 1793.
Papilio crino Fabricius: Talbot, 1939; Varshney, 1993.

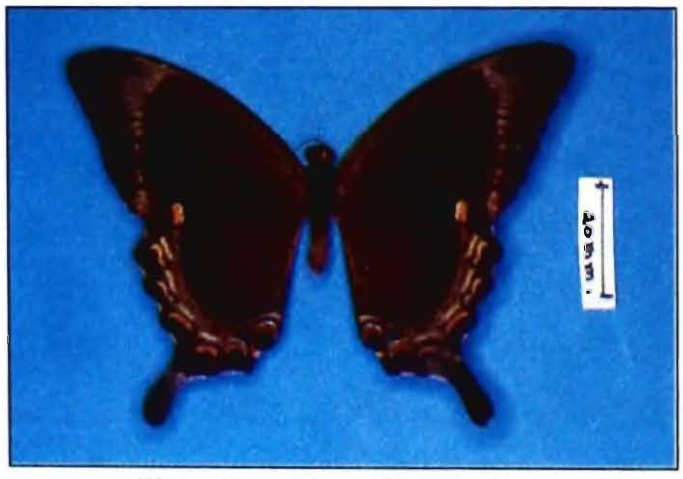
Common name: Common Banded Peacock.

Diagnostic characters: Upperside of wings black; fore wing with

green band not entering cell and wooly streaks along veins 1 to 3 in male and hind wing tail green tipped.

Morphological charactes: **Male-** *Upperside* of both wings black, heavily dusted with green; fore wing with a slightly sinuous and curved bluish green discal band narrowing towards costa and broader at inner margin, black veins crossing the band, thin pilose scent streaks along veins 1 to 3; hind wing with the green discal band broadest in the middle, not entering cell and narrowing at inner margin, tornal ocellus red with a large centre inwardly edged with blue, submarginal diffused green lunules in areas 2 to 4, tail green tipped. *Underside* dull pale brown to blackish brown; fore wing with basal two third blackish brownish area separated by a postdiscal line of white lunules in an outward curve from costa to just before the tornus, the white lunules outwardly diffused and merging with the ground colour; hind wing with tornal ocellus as on upperside, an obscure and ill defined highly arched postdiscal narrow whitish band from above the tornal ocellus to costa ending in a broad white lunule near apex of area 7. **Female**- as in male but upperside of fore wing having bluish green discal band more sinuous and scent streaks absent.

Papilio crino- Female (Upperside)



Papilio crino - Female (Underside)

Variation: The broad green discal band varies in width in hind wing. The following is a male form without scent streaks on veins 1 to 3 in fore wing.

Papilio crino f. *montanus* Felder (Male)- Rare in India. Common in Sri Lanka.

Wing expanse: Male, female 80-100 mm.

Habits: This species is one of the beautiful and migratory butterflies of India. Its flight is rapid. The males sometimes congregate in large numbers at wet sand. They also visit flowers.

Habitat and ecology: It occurs in the plains and seldom flies above 610-915m but occasionally upto elevations of 1830m. In South India, it can be seen throughout the year but very common in July.

Life history: The larva is bluish green, somewhat limaciform, the anterior segments convexly scutellated, furnished with a pair of short fleshy tubercles on anterior and two on anal segments. The pupa is green and curved backwards anteriorly and the head is green and broad in front.

Food-plants: *Chloroxylon swietenia* (East Indian Satinwood).

Distribution: India: Madhya Pradesh, South India , 'Lower Bengal' Elsewhere: Sri Lanka.

Status: Not common.

9. *Papilio demoleus demoleus* Linnaeus, 1758

Papilio demoleus Linnaeus, 1758.
Papilio demoleus demoleus Linnaeus: Talbot, 1939.
Papilio demoleus Linnaeus: Varshney, 1993.

Common name: Lime Butterfly.

Diagnostic characters: Upperside black with almost as much marked with yellow spots on both wings and more yellow on underside of hind wing.

Morphological characters: **Male-** *Upperside* mostly black or very deep brown; fore wing with pale yellow dots at base, these dots forming more or less transverse lines, two obliquely placed spots in the cell, a

Papilio demoleus demoleus- Female (Upperside)

curved spot at the upper angle of cell, a spot at base and another beyond it in area 8, a discal series of creamy yellow spots, irregular in arrangment and size extending from area 1a to area 8, interrupted in area 5 and a double spot in area 7, followed by a sinuous submarginal series of spots and a marginal series of smaller lunules; hind wing with a broad discal irregular yellow band having its inner edge convex and outer edge irregular and uneven, beynd the cell a few creamy yellow spots, a sinuous postdiscal series of outwardly emarginate yellow spots and a marginal series of yellow lunules, an oval orange red spot surmounted by a blue lunule, a black large ocellus like spot irrorated with blue placed between discal and postdiscal spots in area 7. *Underside* ground colour as on upperside but markings paler and much larger, particularly on hind wing; fore wing in the basal half of cell and base of wing below the cell with yellow streaks, the latter coalesce basally, discal band not interrupted in area 5 and spots in areas 5-8 being irregular and ochraceous; hind wing with ocellus in area 7, the apex of cell and the black ground colour between discal and postdiscal markings in areas 2-6 centred with ochraceous, margined with blue. **Female**- as male but hind wing with tornal oval orange red spot being emarginate.

Papilio demoleus demoleus- Female (Underside)

Variation: The upperside of fore wing may have a small discal spot before vein 5 and hind wing with two small spots beyond the cell between veins 4 and 6.

Only the nominate subspecies is found in India having a following form.

P. demoleus demoleus f. *demoleinus* Oberthuer- The upperside of hind wing has a red spot sometimes reduced proximally and, thus, separated from the blue lunule by a black spot.

Wing expanse: Male, Female 80-100 mm.

Habits: Commonly called 'Lime Butterfly', it is a pest of lemon, orange and lime trees. In old age butterflies, yellow markings on wings turn to a deep orange. The butterfly has a very quick and strong flight, not rising much above the ground and is fond of flowers and sun. It also congregates at puddles, where it drinks with closed wings.

Habitat and ecology: It occurs commonly in the plains than in wooded regions and hills and may be seen throughout the year except in very cold winters. It is found in gardens, visiting flowers in swarms during and after the monsoons rains. It may ascend 2135m in the Himalaya.

Life history: The egg is pale yellow. The young larva is blackish but full grown larva is yellow-green with a fairly broad greasy-looking. It is about 33mm in length and seven mm in breadth. It is attacked by parasites. Its pupa is formed on the underside of leaf against a stalk or twig and the supporting loop is rather short. The pupa is about 30 mm in length and 10 mm in beadth. It is green mixed with yellow dorsally on abdomen. When a pupa is formed in a cage or not among leaves, then it is usually of different shades of browns and greys.

Food-plants: *Acronychia pedunculata* (Laojan), *Aegle marmelos* (Bel), *Atalantia racemosa, Chloroxylon swietenia* (East Indian Satinwood), *Citrus aurantifolia* (Lime, Kaghji nimbu), *C. aurantium* (Khatta), *C. hystrix., C. limon* (Lemon), *C. maxima* (Chakotra), *C. medica* (Bara nimbu), *C. sinensis* (Sweet orange), *Cullen corylifolium* (Babch, Bavachi), *Glycosmis pentaphylla* (Ban nimbu, Ashshoura), *Limonia acidissima* (Katbel, Kait, Bilin), *Murraya koenigii* (Curry leaf), *Raphanus* sp., *Ruta chalepensis, Triphasia trifolia* (Limeberry, Chinese Lime), *Zanthoxylem limonella* (Badrang), *Zizyphus mauritiana* (Indian Jujubu, Common Jujubu).

Distribution: India: Punjab, widely distributed in India. Elsewhere: Arabia, Africa, Celebes, China, Malaya Peninsula, Indonesia (Moluccus), N. Australia, Iran, South New Guinea, the Philippines, the Sunda Islands.

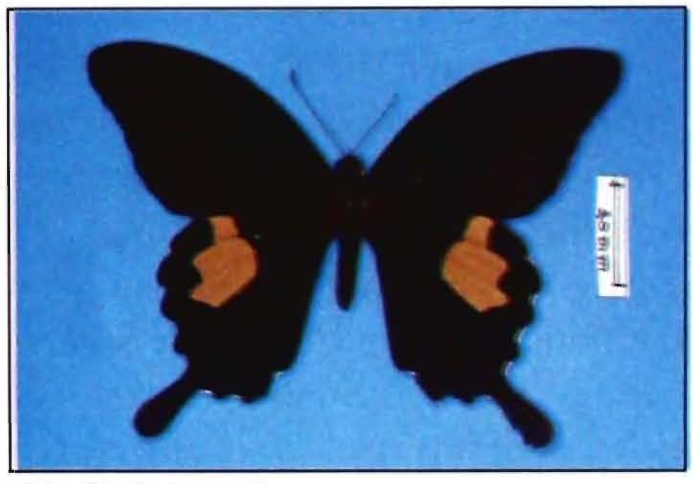
Status: Very common.

10. *Papilio helenus* Linnaeus, 1758

Papilio helenus Linnaeus, 1758.
Papilio helenus Linnaeus: Talbot, 1939; Varshney, 1993.

Common name : Red Helen.

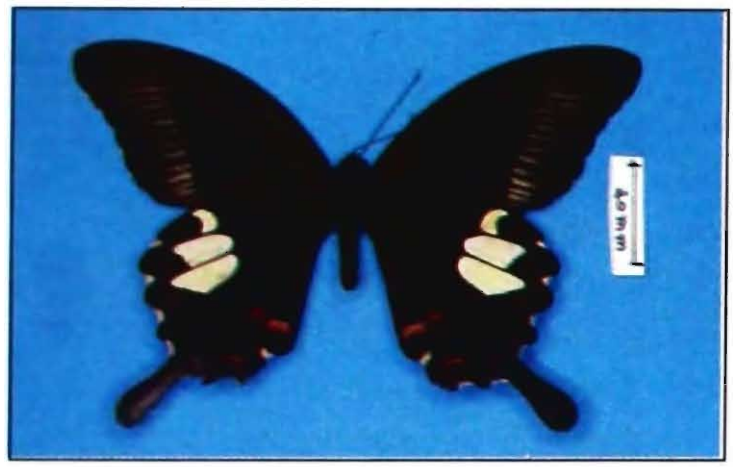
Diagnostic characters: Upperside black, hind wing with a white patch extending over areas 5 to 7 and underside with red submarginal lunules, tail at end of vein.



Papilio helenus helenus- Male (Upperside)

Morphological characters:
Male- *Upperside* of wings brown black; fore wing thickely hairy on disc, with four slender whitish lines in the cell and outer hairy streaks between the veins brown, the latter giving a golden brown appearance in certain lights; hind wing with three white spots in areas 5-7, forming a upper discal patch, the spot in 7 being the smallest and that in area 5 being the largest, a submarginal series of more or less claret red rings in areas 1-5 and tornal ring distinct, each of these rings enclosing a black spot. *Underside* dull black; fore wing with grey white streaks well defined; hind wing with the spots forming discal patch separated by the black veins, these spots outwardly emarginate, submarginal series of rings dull red, tornal and ring in area 1 more or less complete and rest of the series reduced to a curved submarginal line of lunules extending from areas 3-7, an additional

red lunule present in area 2 above the tornal ring. **Female-** Like male but more paler, upperside of hind wing with white discal area usually more prolonged anally and also submarginal spots more distinct.

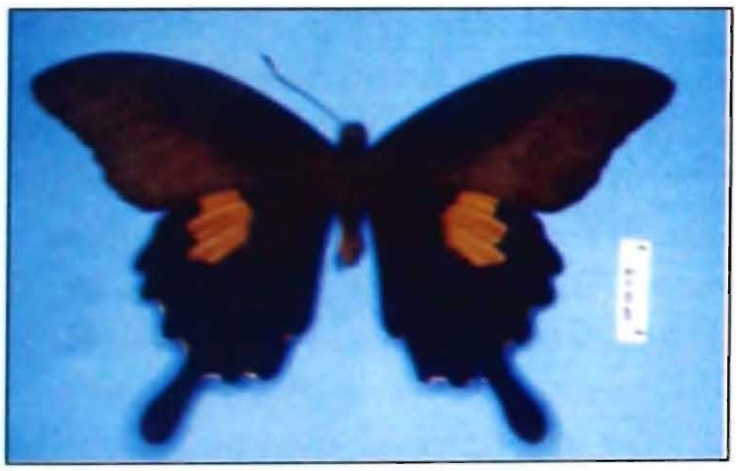


Papilio helenus helenus- Male (Underside)

Variation: The size and shape of white discal spots may vary and these spots may become much reduced or absent on upperside of hind wing.

There are two subspecies occuring in India.

i) P. helenus helenus Linnaeus-.Upperside of hind wing with a more or less quadrate white spot in area 7. Underside of fore wing with pale streaks reaching termen and entering the cell. Uttarakhand (Mussoorie). Malay Peninsula, Myanmar, Thailand . It includes the following form.



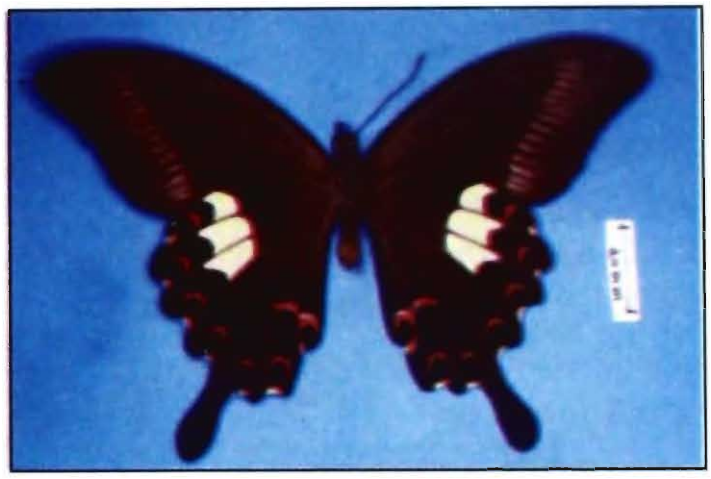
Papilio helenus helenus- Female (Upperside)

P. helenus helenus f. *rufates* (Male) Rothschild- White area on upperside of hind wing is very much reduced and on underside first discal spot is very small or absent; area 2 is filled up with red from the discal to the submarginal spots.

ii) *P. helenus daksha* (Hampson)- (*Wing expanse*: 110-140 mm). The upperside of hind wing with a spot in area 7 being much longer. Underside of fore wing with pale streaks short and neither reaching termen nor entering the cell. Peninsular India.

Wing expanse: Male, female 110-140mm.

Habits: Its flight is very swift and irregular. The butterfly is very striking because of white discal patch on hind wing. It settles at puddles and shady forest paths and also visits flowers. In North India, the individuals of spring brood are smaller than the summer ones. It is a pest on fruits.



Papilio helenus helenus- Female (underside)

Habitat and ecology: The butterfly is common in evergreen jungles having heavy rainfall. It occurs abundantly at low elevations. It is found at elevations of 305-2135m.

Life history: The eggs are laid one at a time on mature leaves of the food-plant in shady places in heavy jungle, choosing small saplings with foliage about 3-6m from the ground. The egg is about 2 mm in diameter, spherical and flattened. Its surface is finely dented and shiny. It is orange coloured, blotched with red-brown pigment. The young larva lies along the midrib of the leaf, but when full-grown generally lives in the centre of the upperside of the leaf, or prefers the stalk or a twig. The larva measures 75 mm in length and 12 mm in breadth. It is rich grass-green above the subspiracular enamel-white band. It is slow in its halting movements and sometimes wanders long distances before pupation. The pupa is 46 mm in length, 19 mm in breadth at segment 7 and head 3 mm in length. It is ordinarily green, with a similar yellow saddle.When the pupa is against a grey bark or in a cage then it may be variegated with brown and pink, black and grey, white and green all together without a yellow saddle. Pupation takes place on the underside of a twig or strong leaf-rib, and the loop is rather long. The yellow saddle makes difficult to see the pupa from below.

Food-plants: *Citrus aurantium* (Khatta), *Citrus maxima* (Chakotra), *Citrus medica* (Bara Nimbu), *Citrus* spp. (Orange, Lime, etc.), *Evodia*

sp., *Glycosmis arborea, G.pentaphylla* (Ban nimbu), *Philodendron* sp., *Toddalia asiatica, Zanthoxylum acanthopodium* (Darmar, Tombul), *Z. limonella* (Badrang, Bazinali), *Z. rhetsa.*

Distribution: India: Peninsular India, Uttarakhand. Elsewhere: Malay Peninsula, Myanmar, Sri Lanka, Thailand.

Status: Common.

11. *Papilio krishna krishna* Moore,1857

Papilio krishna Moore, 1857.
Papilio krishna krishna Moore: Talbot, 1939.
Papilio krishna Moore: Varshney, 1993.

Common name: Krishna Peacock.

Diagnostic characters: Upperside of wings black powdered with brilliant green, fore wing with a white post discal band and hind wing with prominent blue or green patch.

Papilio krishna krishna- Male (Upperside)

Morphological characters: **Male-** *upperside* of wings blackish and dusted with brilliant green; fore wing with a narrow white maculated post discal band having a thin sprinkling of green scales on its inner edge; hind wing with the upper discal patch metallic greenish blue, the latter extending in areas 6 and 7 towards margin and posteriorly connecting with the inner margin by a narrow green band, a submarginal series of purple red lunules in areas 2 to 5 above the tornal ocellus, a series of ochraceous red obscure marginal narrow lunules between the veins. *Underside* of fore wing with slender and faint white lines in the cell, post discal band as on upperside but prominent and broader, the

white spots forming faint submarginal stripes, at inner margin, white spos tinged with blue; hind wing with a curved discal band of white lunules and posteriorly two yellow lunules, other purple markings as on upperside but prominent and larger. **Female-** like male but larger and with broader wings.

Papilio krishna krishna- Male (Underside)

Variation: The upperside of the wings may be densely dusted with green and in fore wing the discal band may be straight, slightly curved or rarely slightly sinuous.

Only the nominate subspecies occurs in India.

Wing expanse: Male, female 120-130 mm.

Habits: This is one of the most beautiful butterflies of India and got its name after the Indian God "Krishna". It flies on bare places on mountains the slopes which are covered with forests of chestnut, oak and magnolia.

Habitat and ecology: The butterfly is found both in jungle and fairly open regions. In Sikkim, it appears during May-June at elevations of 915-2750m.

Food-plants: Chestnut, *Citrus* sp., *Evodia fraxinifolia, Magnolia* sp., *Quercus* sp. (Oak) and *Zanthoxylum* spp.

Distribution: India: Assam, Manipur, Nagaland, Sikkim, South India, West Bengal. Elsewhere: Bhutan, Myanmar.

Status: Not rare.

12. *Papilio memnon agenor* Linnaeus

Papilio agenor Linnaeus, 1758.

Papilio memnon agenor Linnaeus: Bingham,1907; Evans, 1932; Talbot, 1939

Papilio memnon Linnaeus, 1758: Wynter-Blyth, 1957, Varshney, 1993.

Common name: Great Mormon

Diagnostic characters: Upperside of both wings blue black with bluish stripes between veins in both sexes, female with basal triangulr red spot in cell a large black spot beow the cell.

Morphological characters: **Male**- *Upperside* black, with greenish or bluish sheen; fore wing with or without a short red streak at base, light bluish stripes between the veins, these stripes not reaching outer margin and becoming indistinct towards costa; hind wing with light bluish stripes between the veins being prominent and extending into apex of cell. *Underside* of fore wing dull black, with a basal red spot in the cell, stripes between veins more pronounced and entering the cell; hind wing with 3-5 basal red spots, a postdiscal and a submarginal series of black spots above the black centred red spots in areas 1 and 2, respectively, in the tornal area, the postdiscal spots on their inner edges having bluish lunules, submarginal black becoming obscure towards costa. **Female**- *Upperside* fore wing with about basal third red in the cell, this red spot touching a large basal blackish spot below the cell; hind wing towards margin and separated by ground colour into a series of submarginal spots, one of these spots bordered by red in area 2, a white stripe along

Papilio memnon agenor- Male (Upperside)

Papilio memnon agenor- Male (Underside)

Papilio memnon agenor- Female (Upperside)

inner margin having bluish brown stripe followed by black centred red ring distally. *Underside* of fore wing stripes more prominent between the veins; hind wing with broader stripes and submarginal spots, white area 1 with postdiscal and marginal brown spots, white area 2 with postdiscal and submarginal brown spots but marginal spot white.

Variation: Only this subspecies occurs in India. It is extremely variable, particularly its female than the male. Both its males and females are polymorphic.

Male: Its four forms are as under:

Papilio memnon agenor- Female (Underside)

a) f. *agenor* Linnaeus- Upperside of both wings with broad grey blue stripes.

b) f. *primigenius* Rothschild- Male upperside hind wing with heavy pale blue scaling. Assam, Sikkim.

c) f. *polymnestoroides* Moore- Male upperside fore wing with short blue stripes. Assam, "Bengal", Kolkata.

d) f. *depelchini* Robbe- Male upperside hind wing greenish, rarely with pale blue scaling. Sikkim.

Female: Nine forms as follows:

a) f. *alcanor* Cramer- Hind wing tailed. Sikkim. Myanmar.

b) f. *butlerianus* Rothschild- Upperside fore wing sepia and a white area on inner margin. Hind wing neither tailed nor with white patches. Sikkim. Myanmar.

c) f. *polymnestoroides* Moore- Upperside fore wing sepia and no white area posteriorly; hind wing with like f. butlerianus but with a large blue discal area. Assam, "Bengal", Kolkata.

d) f. *rhetenorina* Jordan- Upperside fore wing sepia and no white area posteriorly; hind wing with only slight traces of black patches and no blue scaling, tail and white patches absent. Sikkim.

e) f. *depelchini* Robbe- Upperside fore wing as in f. rhetenorina; hind wing with slight blue scaling and below with a white inner marginal stripe, tail and white patches absent. Sikkim.

f) f. *aphrodite* Roeber- Hind wing with white patches but without tail; abdomen mostly yellow. Nagaland.

g) f. *phoeniciana* Staudinger- Hind wing with a large white patch in areas 1-3, tail absent, abdomen not yellow.

h) f. *phoenix* Distant - Hind wing with extensive white area, 4 or 5 white patches with posterior often broadly red, tail absent; abdomen not yellow. Sikkim. Myanmar.

i) f. *agenor* Linnaeus- Hind wing as in f. *phoenix* but with, 5-7 white or yellowish patches, tail and black discal spots absent; abdomen not yellow.

Wing expanse: Male, female 120-150 mm.

Habits: The male visits flowers and its flight is swift and restless, whereas the female is sluggish and sails more slowly. It occurs commonly near the settlements and in open woods. It is a pest on fruits. The tailless females are known to be bred from the green eggs of tailed female.

Habitat and ecology: It occurs in the northern localities from the spring to the autumn and in the southern localities throughout the year. It is very common at low elevations and may ascend to 2135m in the Himalaya.

Life history: The young larva is brown anteriorly on the thorax and on each of the last two abdominal segments with a pair of light spines, which disappear later. When full grown, it is dark velvety green, here and there bluish, the thorax swollen, with spectacle-marking and black transverse band. The scent-fork in the young larva

black, afterwards red. The pupa is green or brown but yellow above between the wing-cases.

Food-plants: *Citrus aurantium* (Khatta), *Citrus* spp., *Michelia champaca* (Champaka), *Paramygna scandens.*

Distribution: India: Assam, Sikkim. Elsewhere: Myanmar.

Status: Not rare.

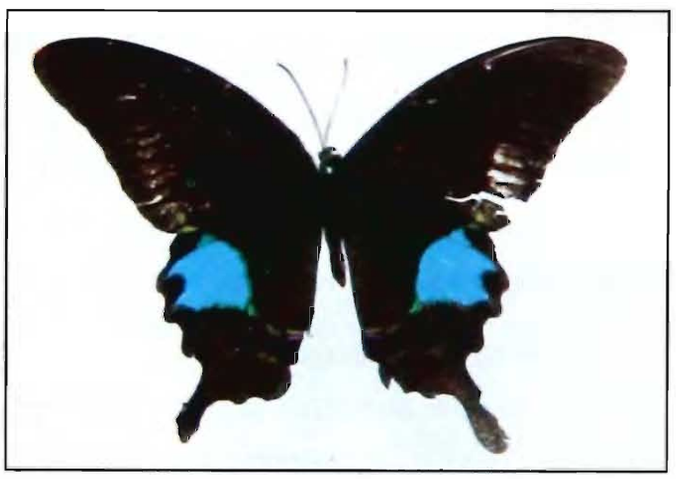
13. *Papilio paris* Linnaeus, 1758

Papilio paris Linnaeus, 1758.
Papilio paris Linnaeus: Talbot, 1939; Varshney, 1993.

Common name: Paris Peacock.

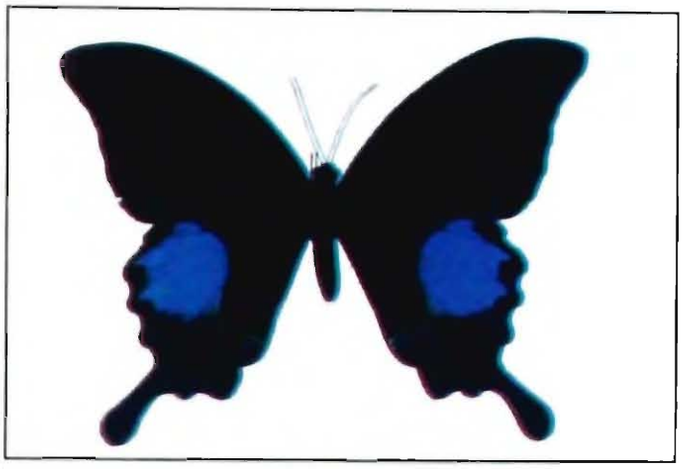
Diagnostic characters: Upperside of wings black dusted with dark green, fore wing with a short post discal green band and hind wing with a prominent blue or green patch.

Morphological characters :



Papilio paris paris- Female (Upperside)

Male- *upperside* of wings irrorated with dark green; fore wing with a green discal band short from inner margin, no scent streaks but rarely a pilose stripe present on vein 2; hind wing with an irregular large patch green or blue according to the fall of light, the patch being broadest behind vein 6 and connected on both sides anteriorly with costa and posteriorly with the inner margin by a narrow green band, a tornal claret red black centred ocellus present, an obscure claret red submarginal lunule in area 7. *Underside* brownish black; fore wing with a series of grey discal stripes between veins, these stripes longer towards costa and shorter



Papilio paris tamilana- Male (Upperside)
(After D' Abrera, 1986)

towards inner margin and not reaching end of cell; hind wing with a complete row of claret red submarginal lunules traversed by curved purple blue marks, in areas 1 and 2 these lunules forming black centred ocelli. **Female**- like male but pale and duller; *upperside* fore wing without any pilose stripe present on vein 2, a green discal band shorter and hind wing with discal patch smaller and green and not blue, the red submarginal lunule always present in area 7 and more prominent. *Underside* of hind wing with the tornal and subtornal markings more or less forming complete ocelli.

Variation: The species exhibits variation in wing expanse, size of green discal band on fore wing and green or blue discal patch which may be paler metallic blue on hind wing. There are two subspecies in India.

i) *P. paris paris* Linnaeus- Underside of fore wing with grey streaks reaching termen. Orissa, Sikkim, Uttarakhand (Kumaon). Myanmar. There is a following single form in India.

P. paris paris f. *splendorifer* Fruhstorfer- It is a smaller dry season form.

ii) *P. paris tamilana* Moore- Underside of fore wing with grey streaks not reaching termen and upperside of hind wing with green discal patch larger extending from veins 3 – 8 and entering the cell. Peninsular India, Tamil Nadu.

Wing expanse : Male, female 90-140 mm.

Habits: This is one of the most beautiful butterflies of India. The males are fond of visiting flowers, often resting in crowds on moist sand. Their flight is very swift and they have the habit of returning

again and again to the same place.The female is seldom seen although the breeding results in more females than males. It likes sunshine and flies in clearings and along forest paths.

Habitat and ecology: The butterfly is found both in jungle and fairly open regions and is confined to evergreen regions. It has not been recorded at elevation below 300m in South India and is strikingly found in the hill stations of Bombay (Maharashtra) and Tamil Nadu. It occurs at elevations of 900-2150m in the Nilgiris during April- June, and in Terai upto 1525m in Sikkim.

Life history: When first laid, the egg is translucent light green, soon becoming more opaque and blotched with brown-red. It is somewhat shiny and superficially pitted. It is small and spherical, with a diameter of 1.5 mm. The egg is largely attacked by ichneumons.The young larva is dark olive-green with ochreous and white markings. The full-grown the larva is of 50 mm in length and 13 mm in breadth. Its colour is bright grass-green and plentifully speckled with yellow. The pupa is about 40mm in length and 18 mm breadth at the middle of 7th segment.

Food plants: *Citrus* sp., *Evodia lunu-ankenda, Toddalia asiatica* (Wild Orange, Forest Pepper), *Zanthoxylum ovalifolium, Z. oxyphyllum.*

Distribution: India: Assam, Maharashtra, Orissa, Sikkim, South India. Elsewhere: Myanmar.

Status : Not rare.

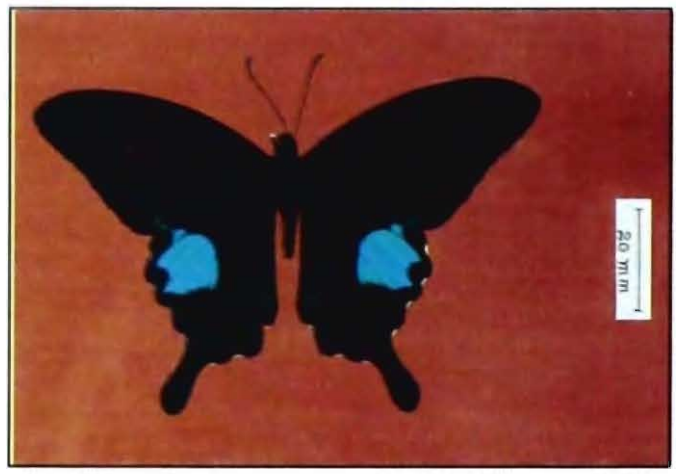
14. *Papilio polyctor* Boisduval, 1836

Papilio polyctor Boisduval, 1836.
Papilio polyctor Boisduval: Talbot, 1939; Varshney, 1993.

Common name: Common Peacock.

Diagnostic characters: Upperside black dusted with golden green scales, a green band which may be diffused, faint or obsolete and hind wing with a large blue or green patch.

Morphological characters: **Male-** *Upperside* of fore wing with a golden-green discal band, anteriorly short, narrow and not reachig costa and posteriorly broader and terminating at inner margin, wooly separated scent stripes on veins 1-3 and those on veins 2 and 3 being strongly narrowed at both ends; hind wing with a large blue or bluish green patch occupying base of area 4 and outer portions of areas 5-7, posteriorly usually prolonged into a band in areas1-3, a tornal claret red lunule traversed inwardly by an obscure blue line and edged above the lunule by black, three or four claret red submarginal spots may be present. *Underside* of wings chocolate brown; fore wing with grey stripes between veins forming grey distal area always entering the cell; hind wing with a submarginal series of claret red lunules traversed with inwardly by a purplish blue line and black spots. **Female-** like male but larger and much paler on fore wing and without any scent stripes.



Papilio polyctor ganesa- Male (Upperside)

Papilio polyctor ganesa- Female (Upperside)

Variation: The species shows variation in extent of golden-green discal band and long pale discal streaks in fore wing and size and colour of discal patch in hind wing. The species has also wet and dry season forms.

There are two subspecies in India.

i) *Papilio polyctor ganesa* Doubleday-The upperside fore wing with golden-green discal band absent or if present then rarely reaching

Papilio polyctor ganesa- Female (Underside)

apex. The underside of fore wing with long pale discal streaks entering the cell and reaching termen. Sikkim. North Myanmar. It has a following form and an abberant.

a) *P. polyctor ganesa* f. *mal* Tytler- Hind wing patch brilliantly green instead of blue. It is cold weather form occurring during February and April. Nagaland.

b) *P. polyctor ganesa* Ab. *porphyria* Jordan- Underside of hind wing with very enlarged submarginal spots.

ii) *Papilio polyctor polyctor* Boisduval- The upperside fore wing with golden-green discal band? prominent?and reaching apex. The underside of fore wing with obscure pale discal streaks not entering the cell. Uttarakhand (Kumaon). Pakistan (Chitral). It includes a single form.

a) *P. polyctor polyctor* f. *peeroza* Moore- It is dry season form and is much smaller.

Wing expanse: Male, female 90-130 mm.

Habits: This is one of the extremely beautiful butterflies of India. The subspecies, *ganesa* Doubleday got its name after the Indian God " Ganesa".The butterfly is bivoltine and appears from February to October. The small dry season form appears before the rains, settling in large numbers on damp patches of mud and the banks of the streams. The larger wet season form is seen in the gardens.

Habitat and ecology: This butterfly is very common in the warm valleys. It is found in the Himalaya and hills of north-east India from low elevations to 2150m.

Life history : The young larva is very dark. The half-grown and full-grown larvae are green with the thorax thickened above like a shield. The pupa is bluish-green, usually with brown markings.

Food plants : *Buddleja* sp., *Citrus* spp., *Clausena* spp., *Hesperethusa crenulata* (Beli), *Zanthoxylum acanthopodium* (Darmar, Tombul). *Z. armatum* (Nepali Dhaniya).

Distribution: India: Nagaland, Sikkim, Uttarakhand. Elsewhere: Myanmar, Pakistan.

Status : Common.

15. *Papilio polytes* Linnaeus, 1758

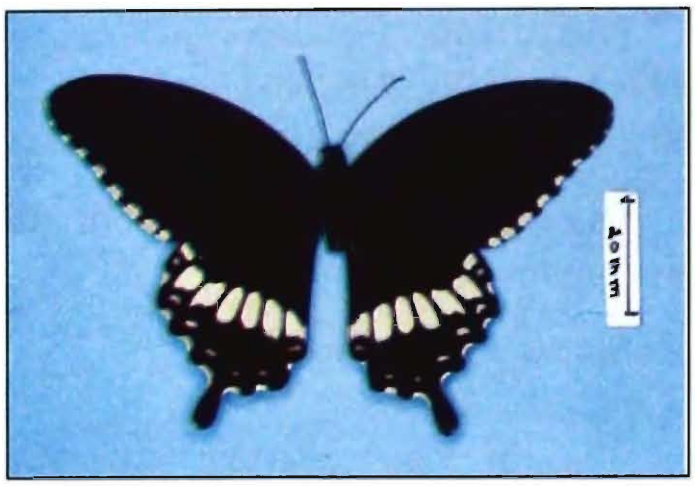
Papilio polytes Linnaeus, 1758.
Papilio polytes Linnaeus: Talbot, 1939; Varshney, 1993.

Common name: Common Mormon.

Diagnostic characters: Tailed.Upperside black, fore wing with a marginal row of white spots, the latter decreasing in size apically and hind wing with a discal series of elongate white spots.

Papilio polytes romulus- Male (Upperside)

Morphological characters: **Male**- *Upperside* black; fore wing with prominent marginal white spots, the latter decreasing in size towards apex and broader towards tornus; hind wing with a post discal band of white spots almost of equal size running from inner margin to area 7, a tornal deeper black obscure spot surmounted by a blue lunule, post discal area with sparse blue scaling, tail at vein 4 presnt. *Underside* dull black, fore wing with prominent streaks in cell and between veins; hind wing with discal series of white spots, a tornal spot separarted from blue scaling by an ochraceous line, a series of submarginal dingy white lunules and a marginal row of white lunules. **Female**- *upperside* like that of male, upperside brown black, fore wing black from base



Papilio polytes romulus- Male (Underside)

to veins 2 or 3 and along outer margin, the posteriorly narrowed central area lighter and traversed by black vein and fold- stripes and outer margin undulate with thin white fringe-spots; hind wing with white or red discal patches, a series of submarginal red lunules and a marginal row of white lunules. *Underside* of wings reddish brown, fore wing darker at base and along the margin, between the veins dark streaks entering the cell; hind wing bearing 2-6 elongate white spots, a large tornal red spot having a black spot, a series of submarginal reddish lunules and a marginal row of reddish-white lunules alternating with brown..

Papilio polytes romulus- Female (Upperside)

Variation: This species is very variable.

The following three subspecies occur in India.

i) Papilio polytes romulus Cramer- It is smaller than other two subspecies and is widely distributed in India. Lingga Islands, Malay Peninsula, Myanmar, Natuna Islands, Tong-King.

The female is has three forms.

a) f. *romulus* Cramer- Fore wing crossed obliquely from middle of cell to tornus by a broad white band, the latter with ill defined edges, beyond apex of cell is diffused white patch. Hind wing with all the discal, submarginal, marginal markings and spot at apex of cell red. It mimics *Pachliopta hector* (Linnaeus).

Papilio polytes romulus- Female (Underside) right side of wings

b) f. *cyrus* Fabricius – Resembles male. Underside hind wing with a series of submarginal ochraceous lunules; in spring these spots are red and larger, and also red on the upperside.

c) f. *stichius* Huebner- Upperside fore wing fuliginous black, darker at base and along outer margin leaving a pale greyish trinaglar area, black streaks between veins entering the cell. Its male has followig three known aberrants.

Ab. *sakontala* Hewitson- Upperside dull brownish; fore wing without white marginal spots (in male-D'Abrera, 1982), ill defined streaks in cell and between veins being sparingly dusted with yellowish scales; hind wing with diffused greenish white discal spots in areas 1-7 and an ill defined tornal red lunule. Underside fore wing with more prominent streaks between veins than on upperside; hind wing basal half black , discal series of elongate dingy white spots prominent than on upperside. Assam, Nagaland, Sikkim,Uttarakhand (Mussoorie). Bangladesh.

Ab. *walkeri* Jans. – Upperside sooty black. Fore wing with four short ochraceous lines in cell, three in area1 and two postdiscal ones in each of areas 1-8; hind wing with broad discal band of blue scaling and postdiscal series of ochraceous-white quadrate spots. Southern India.

Ab. *astreaus* Jordan – Upperside fore wing with much larger marginal white spots entering area 8; hind wing with a discal series of black spots darker than ground colour. Tamil Nadu (Nilgiris).

ii) *Papilio polytes nikobarus* Felder- Male is larger than *romulus*. Upperside of hind wing with a narrower discal band. Nicobar Islands.

Female f. *cyrus*- Upperside hind wing having slightly developed submarginal lunules and band narrow as in male.

Female f. *stichius*- Resembles to mainland specimens.

iii) *Papilio polytes stichioides* Evans- It is larger than *romulus*. Upperside of hind wing without submarginal lunules but discal band broader.Andaman Islands.

Female f. *cyrus*- Upperside hind wing band broader than in the male.

Female f. *stichius*- Larger than mainland specimens, and hind wing with very large and white discal area of five patches.

Wing expanse : Male, female 90-100 mm.

Habits: This species shows sexual dimorphism, and polymorphism in female. It seldom rises far from the ground. It prefers the shelter of bushes, thick places in the Jungle and hedges. It does not come to wet places but fond of visiting flowers. The flight of male is fast and that of female is slow resembling flight of *Pachliopta* models. Although all the three forms of the female are not common yet they fly at the same time.

Habitat and ecology: It occurs commonly in open woods and in gardens at low elevations, in the Himalaya up to 1830m.,

Life history: The egg is spherical and 1-2mm diameter. It is pale orange, opaque, shiny and smudged with pale brown. The larva is about 40 mm in length and 8 mm in breadth at the middle. Its head is yellow, crests on segments 4 and 5 yellow and ocellus black. Dorsally, it is rich glaucous green but slightly yellowish on the sides. It is not subject to the attacks of ichneumons. The pupa is olive-brown, with brown, green, and yellow spots and stripes. The underside its abdomen is milk-white, or the whole pupa is green. The pupal stage occasionally remains for a long time.

Food-plants: *Aegle marmelos* (Bel), *Atalantia racemosa, Citrus aurantifolia* (Lime, Kaghji nimbu), *C. aurantium* (Khatta), *C. hysterix, C. limon* (Lemon), *C. maxima* (Chakotra), *C. medica* (Bara nimbu), *C. sinensis* (Sweet Orange), *Glycosmis pentaphylla* (Ban – nimbu, Ashshoura), *Grewia sclerophylla* (Phalsa), *Limonia acidissima* (Katbel, Kait, Bilin), *Murraya koenigii*

(Curry leaf), *M. paniculata* (Orange Jasmine), *Toddalia asiatica* (Wild Orange Tree), *Triphasia* sp., and *Zanthoxylum limonella* (Badrang, Bazinali).

Distribution: India: widely distributed in India. Elsewhere: Sri Lanka, Myanmar.

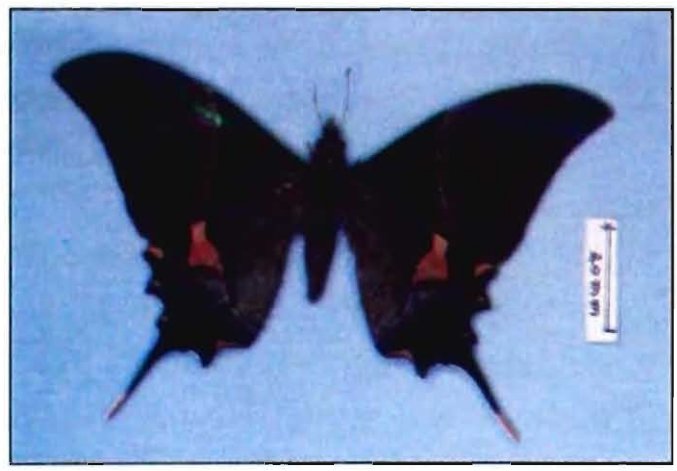
Status : Very common.

16. *Teinopalpus imperialis imperialis* Hope, 1843

Teinopalpus imperialis Hope, 1843.
Teinopalpus imperialis imperialis Hope: Talbot, 1939.

Common name: Kaiser-e-Hind.

Diagnostic characters: Upperside of wings rich green, with a black discal line on both wings, hind wing with a large orange-yellow discal patch in male but absent in female, margin toothed but with tails at veins 4 and 6 in female and one tail at vein 4 in male.



Teinopalpus imperialis imperialis- Female (Upperside)

Morphological characters: **Male-** *Upperside* rich green; fore wing with about one third basal area rich green outwardly oblique and slightly concave bordered by black and greenish yellow bands, grey diffused area between the discal and post discal blackish broad bands, both these bands joining towards inner margin, narrower blackish submarginal and marginal bands, both these bands inlined by diffused greyish yellow; hind wing with a irregular and sinuous black discal line followed by an orange yellow discal patch extending from base of area 3 across apex of cell and bases of areas 4 and 5 to costa, the discal patch being angulated outwards in area 5,

Teinopalpus imperialis imperialis- Female (Underside)

below this patch a white line running to inner margin, postdiscal area dark green bordered inwardly by diffused dark grey, a submarginal series of lunular markings, of the latter tornal and two to three being yellow and others dark bright green, yellow tipped tail at vein 4. *Underside* brownish yellow; fore wing basal one third area green bordered by black, two-third distal area orange-yellow with discal and post discal black bands may or may not be joining posteriorly at inner margin, followed by submarginal and marginal black lines, all these black bands and lines anteriorly short and not reaching costa and posteriorly terminating at inner margin except the submarginal line; hind wing with discal yellow spot extending from costa to vein 3, and other yellow markings as on upperside but broader. **Female**- larger than male, *upperside* of fore wing with one third basal green area darker outlined by slender black and white, distal two third area grey with discal and post discal broader black diffused bands and united at inner margin, followed by submarginal and marginal blackish bands, each of these bands inlined by diffused grey; hind wing with one third basal green area bordered by sinuos black and white lines, a very larger discal patch grey instead of orange-yellow in male, below grey patch narrow markings of yellow reaching inner margin, a postdiscal sinuous lunular narrow black band and marginal series of green lunules as in male but apical lunule being dark grey, marginal teeth at apices of veins 3-6 longer than in male, yellowish grey tipped tail at vein 6 shorter than yellow tipped tail at vein 4. *Underside* like that of male but both fore wing and hind wing areas coloured with rich ochraceous and yellow area grey except well marked moderately broad and dull ochraceous submarginal band; hind wing

almost as upperside but grey discal area extending to the apical lunule of submarginal series.

Variation: Only the nominate subspecies occurs in India and it shows variation in the extent of irroration with green, grey or yellow, size and shape of markings on the wings. The pale grey area on upperside of hind wing in female is highly variable.

Wing expanse: Male, female 90-120 mm..

Habits: This is one of the most beautiful Indian butterflies with restricted distribution in India. The butterfly flies exceedingly fast. It usually remains in the tops of trees from where it only comes down during sunshine in the morning. Interestingly, it visits neither flowers nor water. The females are rarer than the males.

Habitat and ecology: The favourable localities of the butterfly are open places on the tops of mountains surrounded by timber forest, at elevations of 1825- 3050m. It flies during April-May (Sikkim) and May-July (Manipur).

Life history: The caterpillar is green, with a large, thick head, Papilio-shaped. The larva pupates at the end of September. The pupa is oval, greenish, with a strange horn. The butterfly emerges in the following April.

Food-plants: *Daphne sp., Magnolia campbelli.*

Distribution: India : Assam, Manipur, Meghalaya, Nagaland, Sikkim, West Bengal. Elsewhere: Bhutan, Northern Myanmar.

Status: Rare. Females are scarcer than the males. This species is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

17. *Graphium sarpedon* (Linnaeus)

Papilio sarpedon Linnaeus, 1758.

Graphium sarpedon (Linnaeus): Bingham, 1907; Talbot, 1939; Varshney, 1993.

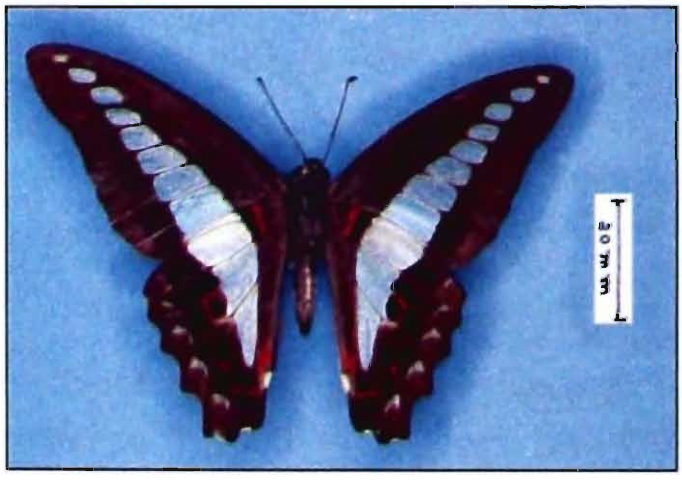
Zetides sarpedon (Linnaeus): Evans, 1932; Wynter- Blyth, 1957.

Common name: Common Blue Bottle.

Diagnostic characters: Black wings. A transparent greenish-blue or pale blue band across both wings. Fore wing pointed and hind wing termen toothed.

Graphium sarpedon teredon- Female (Upperside)

Morphological characters: **Male**- *Upperside* brownish black; fore wing with a semihyaline greenish-blue or pale blue discal band anteriorly narrowed and separated into spots and broader posteriorly having two or three posterior spots closely placed or joined; hind wing with almost continuous discal band continued as from fore wing but broader anteriorly and narrrowed posteriorly, ending on vein 2, below the band two small diffused spots- one greenish and another white present in inner area or on inner margin, the costal part of the band broadest and white and also partly the veins intersecting the band, the latter followed by a row of green submarginal lunules, scent fold (scent organ in the abdominal fold) grey on the inside, furnished with a tuft of long and somewhat stiff white hairs. *Underside* brown, both wings with the semitransparent and blue whitish discal band; fore wing with slight indication of submarginal spots before the tornus; hind wing near base with a short red transverse bar from costal margin to the cell followed by a similar short but black bar separating the discal



Graphium sarpedon teredon- Female (Underside)

band, below this band lies an elongate white spot in the inner area or on inner margin, a series of five red discal spots with the anterior one surrounding the apex of cell and a series of blue whitish submarginal lunules present **Female-** Like that of male but paler with slightly broader wings.

Variation: The discal band varies in width and colouration and the median vein may be black or white on discal band.

There are two subspecies of *G. sarpedon* in India:-

i) *G. sarpedon sarpedon* (Linnaeus)- Upperside with the discal band broader and almost uniformly coloured; hind wing with median vein mostly white on the discal band and tooth shorter at vein 4. Kashmir. Hainan, Lombok, Myanmar, the Philippines, Tong-King (Tonkin).

ii) *G. sarpedon teredon* (C. & R. Felder)- Upperside of fore wing with the discal band narrower and yellowish green anteriorly and hind wing with median vein black on the discal band and tooth longer at vein 4. Peninsular India. Sri Lanka.

Wing expanse: Male, female 80-90 mm.

Habits: The butterfly flies swiftly with skipping flight near the tops of trees and found oftenly visiting flowers. It feeds throughout the day particularly early in the morning and evening. The males congregate in large numbers at wet places on the roads and sandy river-banks. It sometimes moves in small groups in gardens and woods. It is migratory in habits.

Habitat and ecology: It is found mostly in plains, low hills and mostly in wooded regions up to elevations of 2745m.

Life history: The yellowish egg is laid singly on the leaves and shoots of its food-plants. The larva is smooth, thickened from the second to fifth segments and then thickness decreasing to the end. It is black or dark green with numerous spines. There are two short, subdorsal, fleshy spines on the fourth segment, between which is a transeverse pale yellow line. There are two shorter spines also on each of the second, third and anal segments. When full-grown, the

larva is green but underside lighter. It is provided with a longitudinal posterior, lateral and lower pale yellowish line / stripe runnining above the legs. The pupa is green with the thoracic horn slenderer, more pointed, and straighter, the lateral ridges extending straight downwards from the horn. Between this carina and the frontal one is a very slight, somewhat curved vertical ridge.

Food-plants: *Alesodaphne semicarpifolia, Buddleja, Cinnamomum camphora* (Camphor), *C. zeylanicum* (Cinnamon), *Lantana, Litsea glutinosa, Machilus gamblei, Michelia champaca* (Champak), *Michelia doltsopa, Miliusa tomentosum* (Kari, Kirua), *Persea macrantha, P. odoratissima* (Mithapatta), *Phoebe lanceolata, Polyalthia longifolia* (Mast or Cemetery tree).

Distribution : India: Assam, Jammu & Kashmir, Punjab, South India. Elsewhere: Bangladesh, China (Hainan), Indonesia (Lombok), Myanmar, Nepal, the Philippines, Sri Lanka, Vietnam (Tonkin).

Status: Common.

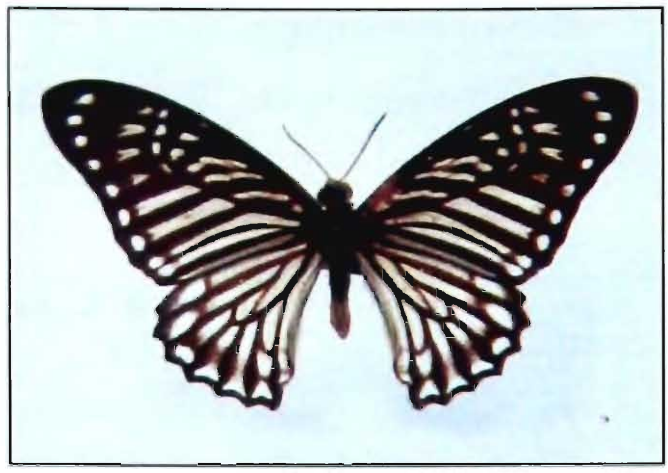
18. *Graphium macareus* (Godart)

Papilio macareus Godart, 1819.
Papilio macareus Godart: Bingham, 1907.
Paranticopsis macareus (Godart): Evans, 1932; Wynter-Blyth, 1957; Varshney, 1993.
Graphium macareus (Godart): Talbot, 1939.

Common name: Lesser Zebra.

Diagnostic characters: Upperside of wings black or brownish black with white or greenish white markings and hind wing with discal steaks in areas 3 to 5 not divided. Underside of abdomen with a black median line.

Morphological characters: **Male-** *Upperside* of wings brownish black or black; white or greenish white markings; fore wing with a short basal spot three transverse and oblique cell stripes, two apical cell spots and four dots outside end cell, distally to dots being four

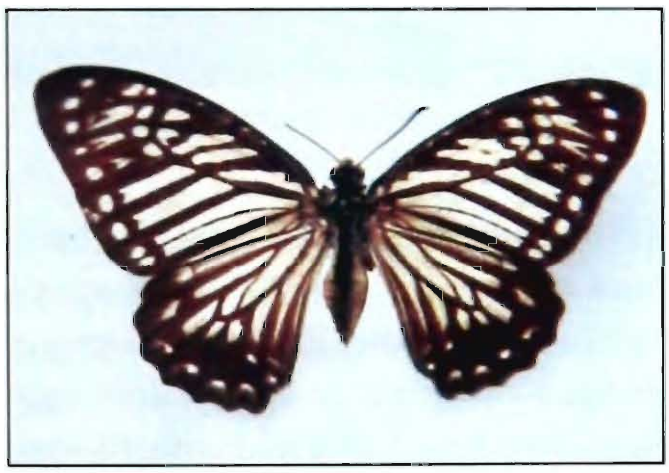


Graphium macareus indicus- Male (Upperside)

outwardly truncate short stripes, also five elongate stripes between vein 4 and the inner margin, two of these five stripes in area 1 may be sometimes confluent, a series of marginal spots present; hind wing cell white and nearly always with a dark bar formed in continuation of vein 4, a series of marginal spots present. *Underside* of wings brownish; distal third of hind wing with the light markings less distinct than on upperside. **Female-** like that of male but much darker.

Variation: The white stripes vary in width may be broken up into small spots in cell of fore wing, and hind wing cell entirely or for the most part white having black transverse line before the apex..

The following two subspecies occur in India.



Graphium macareus indicus- Female (Upperside)

i) G. macareus indicus (Rothschild)- Male with broad white stripes and female having white stripes broader than the black ones. Sikkim.

ii) G. macareus lioneli (Fruhstorfer) – male usually with narrower white stripes and female very dark with white stripes much narrower than the dark ones. Assam.

Wing expanse: Male, female 80-100mm.

Habits: The males congregate in swarms on wet patches but the females may be taken singly in wooded regions /gardens while settling on flowers. This species exhibits Batesian Mimicry as it mimicks the Glossy Tiger, *Parantica aglea* (Stoll).

Habitat and ecology: This butterfly is found at low elevations in India.

Distribution: India: Assam, Sikkim. Elsewhere: Myanmar.

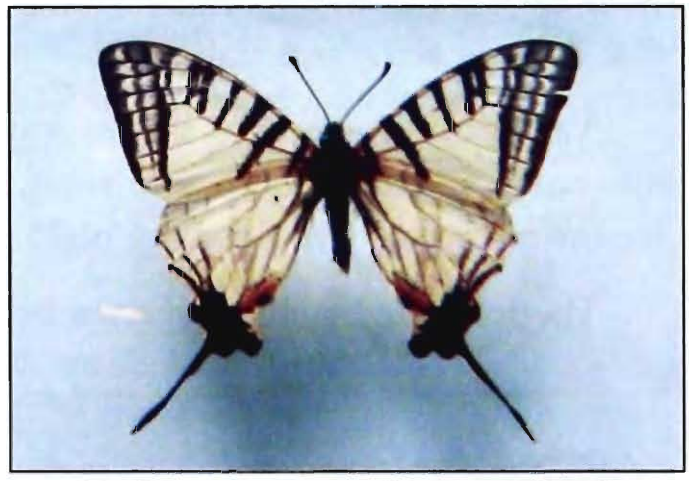
Status: Male not rare, female seldom caught.

19. *Graphium eurous* (Leech)

Papilio eurous Leech, 1815.
Graphium eurous (Leech): Talbot, 1939.
Pathysa eurous (Leech): Wynter-Blyth, 1957; Varshney, 1993.

Common name: Sixbar Swordtail.

Diagnostic characters: Fore wing semitransparent with ten black bars or bands on upperside and hind wing with a sword like tail.



Graphium eurous caschmirensis- Male (Upperside)

Morphological characters: **Male-** *Upperside* black; fore wing semitransparent with ten black bars or bands, of these black bar at end being double and enclosing two pale spots, first and second and four outer partly united marginal bands usually reaching the dorsum; hind wing with a double yellow spot in areas 1 and 2 above a black tornal patch, the latter dusted with greyish blue. *Underside* of hind wing with a complete row of yellow spots between two parallel oblique discal lines; abdominal fold without scent-wool. **Female-** as in male but without abdominal fold.

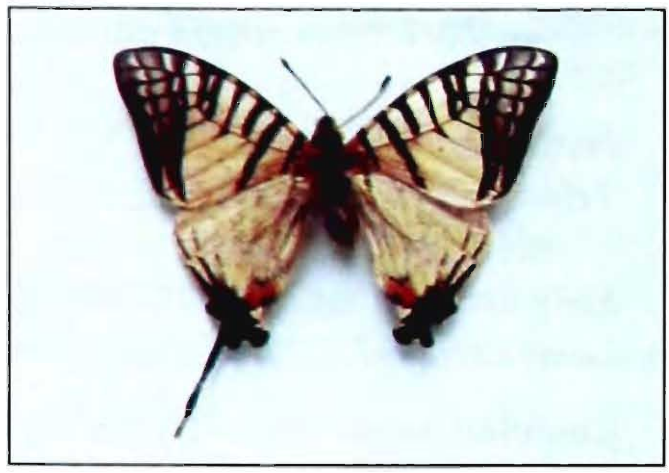
Variation: On upperside of fore wing, the fourth bar in cell from base may cross cell and reach beyond median vein or may not reach below the mediam vein and also the discal line may or may not reach vein1.

There are two subspecies of *P. eurous* (Leech) in India.

i) *G. eurous caschmirensis* (Rothschild)- Upperside fore wing with

fourth band in cell not reaching below median vein and post discal line not extending to vein1. Kashmir, Kumaon.

ii) *G. eurous sikkimica* (Heron) – Upperside fore wing with fourth band crossing the cell and reaching beyond median vein 3 and post discal line extending vein1. Assam, Sikkim.



Graphium eurous sikkimica- Female (Upperside)

Wing expanse: Male, female 60-70mm.

Habits: It is an extremely local butterfly with its single brood appearing in Shimla hills during middle of April- May and in Assam during January. The butterflies fly from spring until July. The males, in numbers together, are fond of resting on the tops of trees. The females fly close to the ground and often settle while searching food plants for laying eggs.

Habitat and ecology: It is found in open places in wooded regions at elevations of 915-2750m. In Sikkim, it occurs at elevations of 600-1200m.

Life history: The larva is green and dotted with black. The pronotum bears an yellow transverse band which is laterally continued to anal segment. Each of the three thoracic segments has a pair of black spines. The anal process is yellow with its tip black and curved laterad. The pupa is slender and green with four yellow lines. The females always emerge after the males.

Food-plants: *Machilus duthiei, Michelia doltsopa, Persea americana, P. odoratissima* (Mithapatta).

Distribution: India: Assam, Jammu & Kashmir, Sikkim, Uttarakhand. Elsewhere: Taiwan, Western and Central China.

Status: Not rare.

20. *Lamproptera curius curius* (Fabricius)

Papilio curius Fabricius, 1787.

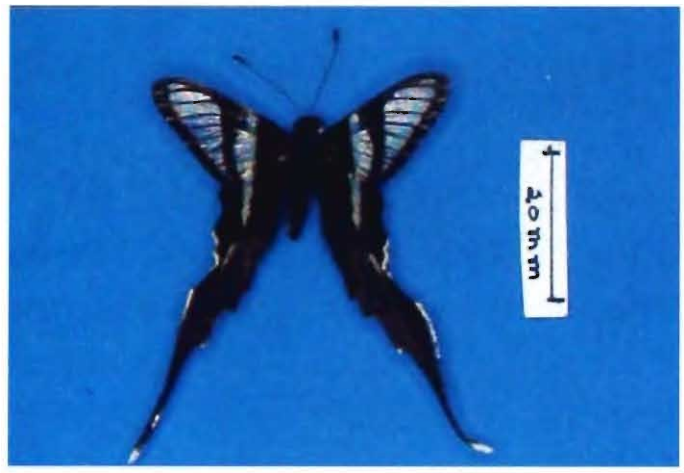
Leptocircus curius (Fabricius): Bingham, 1907; Evans, 1932, Wynter-Blyth,1957.

Lamproptera curius curius (Fabricius): Talbot, 1939.

Lamproptera curius (Fabricius): Varshney, 1993.

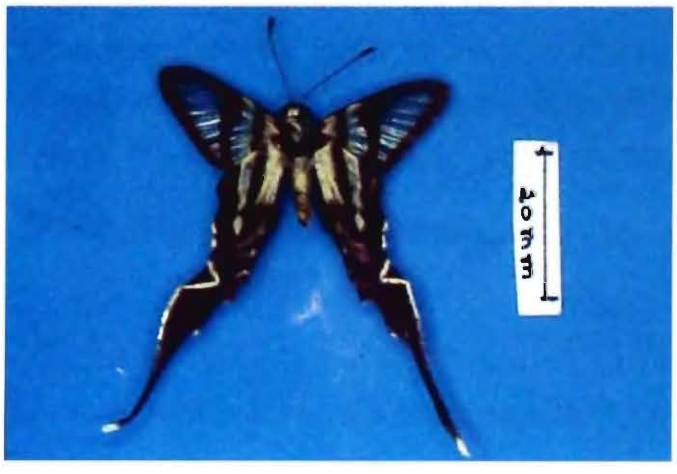
Common name: White Dragontail.

Diagnostic characters: Upperside black. A triangular black bordered colourless transparent area on the outer half of fore wing and hind wing with a very long tail at vein 4 (25 to 40 mm).



Lamproptera curius curius- Female (Upperside)

Morphological characters: **Male**- *Upperside* dull brownish black; fore wing with a oblique white transparent band crossing the black basal area, followed by black band narrowing in the middle and a transparent triangular black bordered area in the outer half, the costal black border narrow but marginal border broadened apically, transparent triangular crossed by black veins; hind wing with the white band of fore wing continued straight across and ending on outer half of vein 3, the band being not outwardly transparent, distal half of wing dull dark brown, at vein 4 ending in a very long tail; a white scent organ in dorsal fold. *Underside* fore wing ground colour light brownish black with basal area grey white; hind wing opaque brownish black with



Lamproptera curius curius- Female (Underside)

basal area broadly grey white and extending along the inner margin, a sinuous short white cross line from inner margin joining the white band, below the sinuous line tornal area bearing a number of irregular white spots. **Female-** *upperside* like that of male, but hind wing without any scent organ; a large ventral copulation- groove present before the tip of the abdomen. *Underside* like that on upperside, but the ground colour opaque brownish black.

Variation: Only a nominate subspecies showing variation in width of stripes on wings occurs in India.

Wing expanse: Male, female 40-45 mm.

Habits: The butterfly has very swift flight resembling that of dragonflies. It feeds on flowers. It drinks much quantity of water and often squirting the water out again rhythmically at the anus.

Habitat and ecology: This butterfly inhabits open jungle, in clearings and along paths. They occur near the water in open places, over which they dart backwards and forwards near the ground. They are commonly found hovering at flowers.

Life history: The egg is like that of the genus *Papilio*.

Food-plants: *Illigera* sp.

Distribution: India: Assam, Manipur. Elsewhere: Java, Myanmar, the Philippines..

Status: Not rare.

FAMILY PIERIDAE

The fore legs are perfect in both sexes and the tarsal claws bifid. Hind wing with a precostal vein in Pierinae, but absent or greatly reduced in Coliadinae, and veins 1a and 1b always present. Cell closed in both wings. Hind wing with the inner margin channelled to receive the abdomen. Wings with the termens more or less smooth except in *Dercas* where they are angled. The butterflies are usually of medium size. In most genera the males have secondary sexual characters; abdominal tufts are found in *Appias* Huebner and sex patches in *Catopsilia* Huebner and *Terias* Swainson.

SUBFAMILY PIERINAE

Palpi with segments 1 and 2 furnished with a pair or bristles below.Fore wing with 10-12 veins, vein 6 either given off from 7 or vein 6 arising from the upper angle of cell or just above it. Hind wing with a well developed precostal vein, the latter directed distad.

21. Appias albina darada (C. & R. Felder)

Pieris darada C.& R. Felder, 1865.
Appias albina darada (C. & R. Felder): Evans,1932; Talbot, 1939.
Appias albina (Boisduval): Wynter Blyth, 1957; Varshney, 1993.

Common name: Common Albatross.

Diagnostic characters: Upperside white. Fore wing with edge of basal black area slightly incurved and blackish apical and marginal markings narrow in male but broader in female.

Morphological characters: **Male-** *Upperside* white; fore wing with narrow black apical and marginal markings, basal black area with edge slightly incurved; hind wing with small spots at ends of veins. *Underside* of wings unmarked; fore wing with apical area and hind wing pale dull ochraceous. **Female-** like male but *upperside* of fore wing with light basal black scaling, having apex, costa and termen black, 4 to 5 apical white spots present, the marginal black border

deeply indented in area 2 and wihout any spot in cell; hind wing with narrow black marginal border and without any basal black scaling.

Appias albina darada- Male (Upperside)

Variation: Only this subspecies occurs in India. In male, the upperside of fore wing with black apical and sometimes marginal scaling absent in dry season form; underside apical area of fore wing and entire hind wing pale dull ochraceous.The female is polymorphic of which two/three forms are found in India. All the three forms occur during wet and dry seasons and f. *principalis* being more frequent in dry season. In these forms, there are variations in the extent of black markings and size of apical spots.

Appias albina darada- Male (Underside)

Female: a) f. *principalis* Fruhstorfer: Upperside white; black areas broader in WSF; apical spot large or partly or partly merging with ground colour in DSF. Underside of fore wing having an irregular narrow postdiscal black band, the latter narrower and diffused in DSF, apical area bluish white; a costal basal stripe of greenish yellow, more or less oblique and narrowing marginally (distally); hind wing bluish white. Sri Lanka.

Female: b) f. *semiflava* Fruhstorfer: Resembles *principalis* but underside of fore wing at apex and underside of hind wing rich yellow. Sikkim, Myanmar

Female: c) f. *flava* Roeber: Markings as in *semiflava*, upperside

yellow. Underside of fore wing with apical area yellow and proximal area sulphur yellow and hind wing yellow. South India. Sri Lanka.

Wing expanse: Male, female 60-75 mm.

Habits: This butterfly is a fast flier and is found in wooded regions. It frequently visits flowers. The males settle in large numbers on wet patches and damp roads but the females do not. Both sexes go to rest on the undersides of leaves during the heat of the day. It is migratory in habits.

Habitat and ecology: The butterfly is very abundant in the hills and more jungle parts of South India. It is abundant in Nilgiris at lower elevations, and even on the plateau during February- March. In Sikkim, it does not occur above 900-1200m except when it migrates.

Life history: The female lays yellow coloured and bottle shaped eggs in small batches. On hatching, young larva eats egg shell its first food. It grows in size as it feeds on tender leaves and buds. The full larva is light green with a yellow-white spiracular band from 2nd to12th segments, the band expanding on 12th segment. The head is round, shining and yellow and is covered with small conical setiferous black tubercles. Its body is rugose, and from above the spiracular region over the dorsum covered with six transverse rows of small, shining, setiferous and conical black tubercles to each segment. The segments 2nd, 12th and 13th have only a few transverse rows of such tubercles. The pupa is dirty whitish, with a pink shade on 4th to 14th segments. The pupation takes place on under surface of the leaves. The imago emerges after a week.

Food-plants: *Capparis* sp., *Drypetes sepiaria* and *Drypetes venusta.*

Distribution: India: Andaman & Nicobar Islands, Peninsular India, Sikkim. Elsewhere: Bangladesh, Myanmar, Sri Lanka.

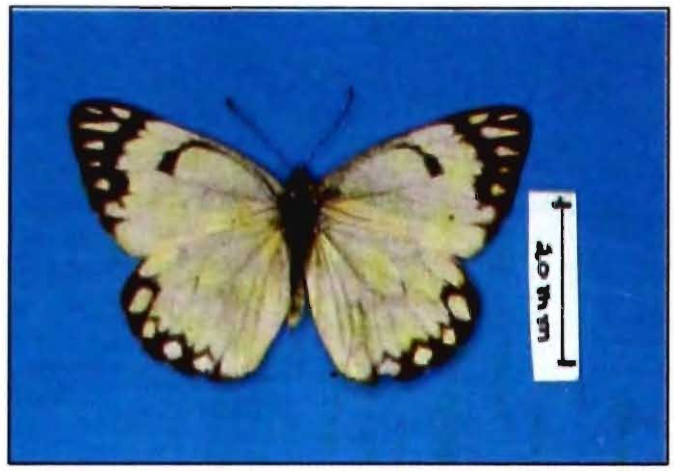
Status: Common in hills of South India but not common elsewhere. This subspecies is given protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

22. *Belenois aurota aurota* (Fabricius)

Papilio aurota Fabricius, 1793.
Anapheis mesentina (Cramer): Bingham, 1907.
Belenois mesentina mesentina (Cramer): Evans, 1932.
Anaphaeis aurota aurota (Fabricius): Talbot, 1939.
Belenois aurota (Fabricius): Wynter Blyth, 1957; Varshney, 1993.

Common name: Pioneer.

Diagnostic characters: Upperside white with black apical area bearing six white spots and a prominent curved (hockey-stick mark) black discocellular bar on fore wing.



Belenois aurota aurota- Male (Upperside)

Morphological characters: **Male**- *Upperside* white; fore wing with a prominent curved (hockey-stick mark) black discocellular bar, from costal area to base of vein 11 dusky black, a broad black apical area narrowing to vein 2 with its inner edge anteriorly straight to vein 4 and excurved in area 2, apical area having six white spots, of which the anterior four being elongate; hind wing with a black marginal border bearing four round white spots in areas 2 to 5. *Underside* of fore wing as on upperside but the markings prominent and the apical spots larger; hind wing yellowish white with veins broadly bordered with black, areas 1, 2, 6 and 7 with black cross bars, and a marginal black border with white spots as on upperside. **Female**- like male but fore wing *upperside* with black markings broader and the white apical spots often obsolete.

Variation: Only the nominate subspecies occurs in India with both the wet and dry season forms.

WSF- Upperside of wings shows variation in cream colouration. The underside of fore wing sometimes with the base of cell and apical

spots elongate and entire surface of hind wing varying to rich chrome yellow.

Belenois aurota aurota- Male (Underside)

B. aurota aurota f. *lordaca* (Walker) DSF- Like WSF but upperside of fore wing with black markings narrower and apical area with broader and longer white markings; hind wing with the white submarginal spots larger and almost merging with the white ground colour on the inner side. The underside of fore wing pure white but on hind wing slightly yellowish.

Wing expanse: Male, female 40-55 mm

Habits: It is common butterfly of open country in dry regions. with strong and erratic flight. It is fond of sunshine. Both sexes visit flowers and males are found on damp patches.The females of a brood emerge before the males. It flies low, resting on the ground with wings closed and, in dull weather, with the fore wings drawn down between the hind wings.

Habitat and ecology: It is found at elevations of 2600m in the Himalaya and up to the tops of the S. Indian Hills. In the Himalaya, it is seasonal and has at least three broods; elsewhere it is found almost all the year except where the winters are cold and the summers very hot and dry.

Life history: The eggs are laid in clusters, up to 200 in a batch, on the young shoots or the undersides of young leaves. About 25 eggs are laid, very close to each other, but not touching one another, placed on the upper surface of the leaf. The egg is about 1.0mm long, semi-conical and bright yellow. The larva when hatched is only 2.0mm long, olive coloured with a distant glossy jet-black head. The larva eat its way out near the top as a rule, and does not eat the egg-shell. The larvae herd together during the first stages. After two moults, it

is about 30mm in length, cylinderical, broader towards the head, slightly tomentose on back and hairy on the sides. The larvae separate in the last stage and they are much subject to attack by parasites. The pupa is succincta and 16mm long and is of transparent pale cream colour. The pupation often takes place in company, one close up against the other on a perpendicular surface, or horizontal, on the upperside or underside of a leaf or against a stone or tree-trunk indiscriminately. The females of a brood emerge before the males.

Food-plants: *Cadaba farinosa* (Kodhah), *Capparis decidua* (Kurrel, Karer), *C. heyneana, C. sepiaria, C. spinosa* (Kabra), *C. zeylanica* (Ardanda, Kalokera), *Jasminum multiflorum* (Chameli, Downy Jasmine), *Maerua cylindrocarpa.*

Distribution: India: Punjab, widely distributed except Assam, a straggler in Great Nicobar. Elsewhere: Africa, Palestine (Israel-Jordan), Sri Lanka.

Status: Common.

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23. Colotis amata (Fabricius)

Papilio amata Fabricius, 1775.
Colotis amata (Fabricius): Bingham, 1907; Varshney, 1993.
Colotis calais (Cramer): Evans, 1932; Wynter Blyth, 1957
Colotis calais amata (Fabricius): Talbot, 1939.

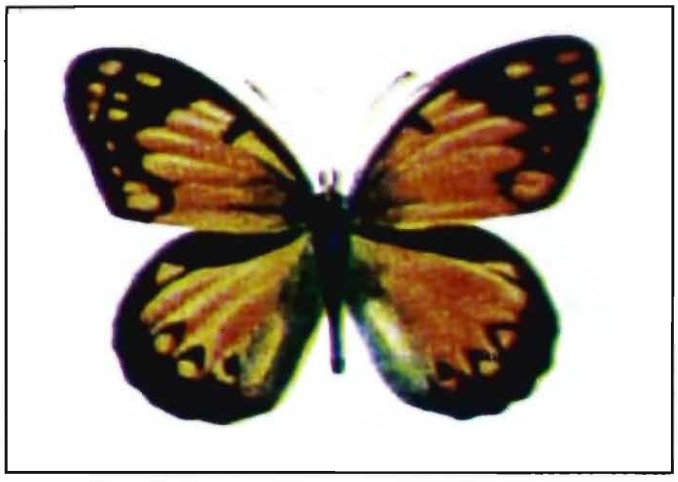
Common name: Small Salmon Arab.

Diagnostic characters: Salmon coloured, with broad black salmon-spotted borders. Fore wing upperside with a prominent discocellular spot joining dark costal border and the outer border shifted in area 1b enclosing a large pale spot.

Morphological characters: **Male**- *Upperside* ground colour salmon pink; fore wing with a dark costal border, the latter reaching a prominent discocellular spot, the black border projecting inwards near/close to a pale submarginal spot in area lb; hind wing with a broad outer black border bearing more or less distinct spots of the

Colotis amata amata- Male (Upperside & Underside) after Varshney, 2007

ground colour and a band of dense black specialized scales (androconia) on costal margin. **Female-** *upperside* as male but paler and duller; hind wing without the black band of androconia. *Underside* ground colour much paler and more ochraceous than green; fore wing with an anterior postdiscal curved fuscous band; hind wing with a discocellular spot larger and annular and a curved discal series of reddish spots from costa to inner margin.



Colotis amata modestus- Male (Upperside) after Wynter-Blyth, 1957

Variation: In damp areas black markings on upperside are larger and more intense. The female is dimorhic occurring as WSF and DSF. The female of DSF- f. *carnifer* (Butler) is with ground colour pale primerose-yellow to pure white. There are two subspecies in India.

i) *Colotis amata amata* (Fabricius): Fore wing upperside with black spot in area 1b large and quadrate, marginal spots pale and large. Maharashtra (Mumbai), Uttar Pradesh. Iran, Sind, Syria.

ii) *Colotis amata modestus* (Butler): Fore wing upperside having tornal spot in area 1b smaller and not quadrate and the marginal spots also small. The female occurs in two forms- one resembles male and the other f. *albina* (Evans) has upperside white. Peninsular India and 'Bengal'. Sri Lanka.

Wing expanse: Male, female 35-50 mm.

Habits: This species has a fluttering flight which is almost straight, horizontal and close to the ground. It rarely settles on flowers but often rests with wings partially open on a leaf when basking. At night or in a dull weather, it rests with wings closed over the back on the underside of some leaf in a thicket. In the more southern parts there is a white female form. There are two white females in every brood of about 50 individuals which is independent of climate

Habitat and ecology: The butterfly is found at low elevations and in open waste places where its food plant grows.

Life history: The eggs are laid in a batch of 50-60 on the upperside of a leaf. The egg is white at first, turning yellow later. It is a truncated cone, with longitudinal channels, and fine, tranverse striae. The first meal of hatched the larva is egg shell. The gregareous larvae eat voraciously and grow very fast. The caterpillars feed in rows along the edge of a leaf, lying close pressed one against the other, and continue thus up to the last stage, when they become more independent though still keeping in batches. The 5th instar larva is bright grass-green with length of 20mm and breadth of 3 mm. Its body surface bears a broad white dorsal line, generally showing the transverse lines of the segments as slight depreasions throughout its length ; sometimes a fine, light, very thin spiracular line. The larval period is of 7-8 days. Each larva goes off to pupate separately. The pupa is green, with the lateral outline along the wings yellow. It measures about 16 mm in length and 3.6 mm in breadth. Its snout is conical, equilateral and its base being reckoned as the whole pupal diameter at the front margin of segment 2. The real snout is only the very extremity of this cone and it is very short. The cremaster is nearly square, gently concave at the end, depressed dorsally between slightly prominent subdorsal ridges, slightly depressed ventrally between the rounded marginal ridges, each slightly prominent extensor-ridge ending anteriorly in a little point or sharp tooth; the suspensory hooklets are arranged in a dense mass all along the posterior margin. The pupal stage lasts for 4-5 days.

Food-plants: *Azima tetracantha* (Kantagur-kamai, Trikanta-gati), *Salvadora oleoides, S. persica* (Mustard tree, Saltbrush, Tooth-Brush tree).

Distribution: India: Maharashtra, Uttar Pradesh, Uttarakhand. Elsewhere: Iran, Sind, Syria.

Status: Common.

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24. *Colotis danae* (Fabricius)

Papilio danae Fabricius, 1775.

Colotis danae (Fabricius): Bingham, 1907; Talbot, 1939; Wynter Blyth, 1957; Varshney, 1993.

Colotis danae danae (Fabricius): Evans, 1932.

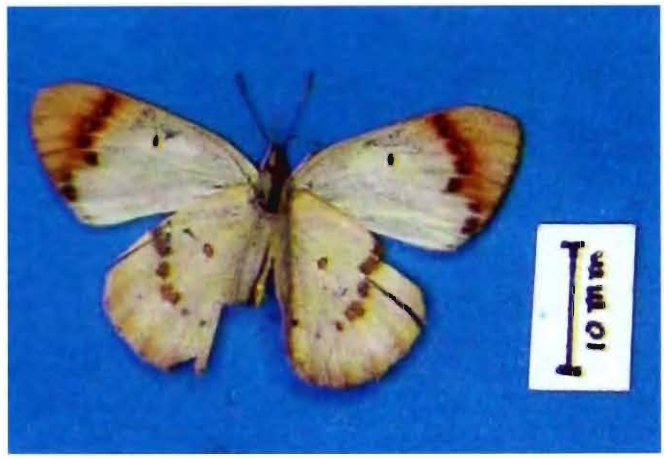
Common name: Crimson Tip.

Diagnostic characters: Upperside white with apical area crimson, the latter in female traversed by a dark macular band.

Morphological characters: **Male-** *Upperside* white; fore wing with a broad inwardly black edged crimson apical patch; hind wing with a black band or black spots on termen. **Female-** like male but fore wing *upperside* with apical crimson area reduced and paler, the latter crossed by a line of small black spots; hind wing with a line of small black spots.

Colotis danae danae - Male (Upperside)

Variation: The species is variable and there are two subspecies found in India.



Colotis danae danae - Male (Underside)

i) C. danae danae (Fabricius)- Black edging to crimson apical patch broader and margin continuous black on hind wing in WSF. The extreme DSF is f. *tapilini* (Swinhoe) having much reduced black markings and the underside with apical area of fore wing and entire hind wing reddish-ochraceous. The f. *sanguinalis* (Butler) is an intermediate form applied to DSF as a whole. Peninsular India (Palni Hills). Sri Lanka.

ii) *C. danae dulcis* (Butler)- Black inner edging to crimson apical patch narrower and black margin macular on hind wing. It more variable than the nominate subspecies and with markings more characteristic in DSF. Kathiawar. Baluchistan, Sind.

Its DSF occurs in three forms.

f. *subroseus* (Swinhoe)- The hind wing underside is of sandy rose colour and the dark spots with red centres.

f. *immaculatus* (Swinhoe)- It is a male form with hind underside scarcely marked.

f. *dirus* (Butler)- It is a female form having a narrow subapical band consisting of short stripes of pinkish-white or red.

Wing expanse: Male, female 40-50 mm.

Habits: It flies low, jerky and sailing. With the exception of the male of *C. fausta* (Olivier) this butterfly flies straighter than other Indian species of the genus. It keeps to the ground. The females are found lesser than the males. It is a pest on vegetables.

Habitat and ecology: It is found in open spaces away from the thorny bushes more than any other member of the genus. The butterfly is common in the Palni Hills during April-June and August-October.

Life history: The eggs are laid singly on an old leaf or its stalk. It is usually glaucous-green, with many indistinct whitish spots or short lines. There is a broad spiracular white line, which may be bordered above by plum-colour or brown-orange. It is 20 mm in length and 3-5 mm in breadth. It is much subject to the attacks of parasites. The larva turns pink before pupating. The pupa is green or bone-colour, with slight marbilings and transverse lines, which in the green form may be absent. It is stout with a short, thickly conical head process and a prominent ventral wing-bulge Its thorax is moderately humped. It measures15-16 mm in length and 4-5 mm in breadth. The pupa is attacked by flies. The pupal stage lasts about a week.

Food-plants: *Cadaba farinosa* (Kodhab), *Capparis divaricata,C. sepiaria, Maerua cylindrocarpa.*

Distribution: India: Central India, Gujarat, North- West India, Peninsular India. Elsewhere: Africa South of Sahara, Pakistan, Iran, Sind, Sri Lanka,

Status: Not rare.

25. *Cototis etrida etrida* (Boisduval)

Anthocharis etrida Boisduval, 1836.

Cototis etrida (Boisduval): Bingham, 1907; Wynter-Blyth, 1957; Varshney, 1993.

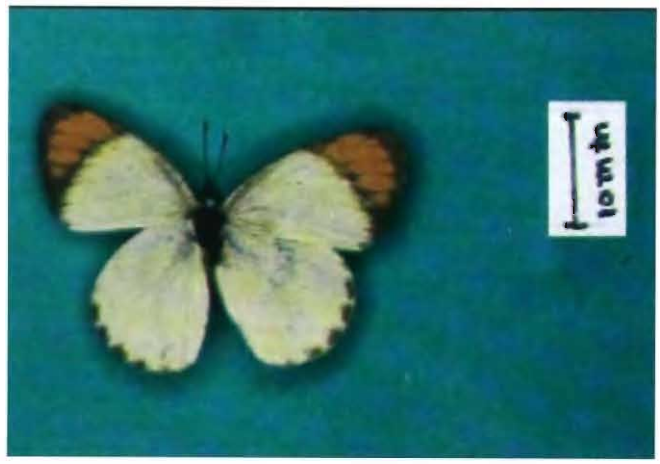
Cototis etrida etrida (Boisduval): Evans, 1932; Talbot, 1937.

Common name: Little Orange Tip.

Diagnostic characters: Upperside white and fore wing with apical orange patch edged with black on the inner side.

Morphological characters: **Male-** *Upperside* white, the bases of both wings sparsely dusted with black; fore wing with a small black

discocellular spot as well as inwardly and outwardly black edged orange apical patch; hind wing with terminal black spots. **Female-** like male but *uppersde* of fore wing with orange apical patch narrower and a small black spot in the middle of areas 1b and 3 and hind wing with terminal spots slightly larger.



Cototis etrida etrida - Male (Upperside)

Variation: Only the nominate subspecies, *Cototis etrida etrida* (Boisduval) occurs in India. It shows variation in dry localities where it is referred as f. *casimirus* (Butler) having orange apical patch paler and black markings obsolete and underside of hind wing and apical area of fore wing are more or less ochraceous.

Cototis etrida etrida- Male (Underside)

Wing expanse: Male, female 25-45 mm.

Habits: It is a slow-flying butterfly of the plains. It is one of the most feebly flying butterflies in India, fluttering along the stems of grasses and bushes, keeping very close to the ground. It is the hardiest butterfly even flying during very hot and dry weather when the other *Colotis* are absent.

Habitat and ecology: It is found in hot lowlands with long dry period and paucity of vegetation offering suitable condtions. It ascends 2600m near Shimla and 2280m in the Nilgiris.

Life history: The eggs are laid singly. The is longer than broad with the apical third conical. It bears eight longitudinal ridges, which are transversely striate. Its surface is shiny and at first yellowish and changing to reddish, caused by profuse blotching. The larva resembles that of *Terias hecabe* (Linnaeus), but the anal segment ends in two short and obscure knobs. A broad white spiracular band touched with orange above each spirale, and bordered below by a slight less broad purplish-chocolate band; venter green. Length, 19; breadth, 3mm. The larva feeds upon capers, and has been bred most commonly upon *Cadaba farinosa.* The pupation takes place on the underside of a leaf near the ground, so that the chrysalis is exposed to the soil or a dead leaf or other light object. The pupa is also of the type of *Terias hecabe* (Linnaeus). It measures 18mm in length and 3.5mm in breadth. Its snout is slightly upturned and cremastral extremity distinctly bifid. Its ground colour is pinkish bone and there is a prominent green sepia band above the spiracular line from segments 6 to 13. A similarly coloured dorsal band runs from the head to the same segment (13th segment). The abdomen is streaked with three similar light coloured lateral bands. When the pupa is formed among leaves the green colour is more strongly developed.

Food-plants: *Cadaba farinosa* (Kodhab), *Capparis decidua.*

Distribution: India: Himalaya, Peninsular India, Sikkim, West Bengal. Elswhere: Pakistan.

Status: Common.

26. *Delias eucharis* (Drury)

Papilio eucharis Drury, 1773.

Delias eucharis (Drury): Bigham, 1907; Evans, 1932; Talbot,1939. Wynter-Blyth,1957; Varshney, 1993.

Common name: Common Jezebel.

Diagnostic characters: Upperside white with black veins and hind wing underside yellow with red border.

Morphological characters: **Male**- *Upperside* white; both fore- and hind wings with a black outer discal band; fore wing with black veins, a submarginal row of seven white spots, the latter (except the lower most spot) distally pointed and touching the margin, a linear apical mark present. *Underside* of fore wing white and all the veins heavily marked, hind wing yellow with black veins and black border bearing a submarginal row of six large red spots, each spot edged with a dusting of dull white and having a shape of a square or subtriangular with the pointed distal end touching the margin, the marginal area between the spots being black. **Female**- like male but *upperside* white, tinged with yellow and pink and more heavily marked, red spots of submarginal row smaller; hind wing with black veins and a prominent row of six submarginal white spots tinged with pink. *Underside* of fore wing with subapical spots yellow and hind wing with veins more blackened.

Delias eucharis- Male (Upperside)

Delias eucharis- Male (Underside)

Variation: The species shows much variation on the underside. The underside of fore wing may have ground colour yellowish. In very dark individuals, light markings are much reduced on unerside

of fore wing. A rare aberration occurs having hind wing spots yellow instead of red.

Wing expanse: Male, female 66-83 mm.

Habits: This species is good model of *Prioneris sita* Felder. It is an ornament among the butterflies occurring in India. The male emits very strong scent which is like that of sweet briar. It is also migratory. They drink at moist patches on roads and in river beds in the hot weather. The females fly slowly and high among the leaves and looking for suitable food plants for laying eggs.

Habitat and ecology: It is found at elevations of 1830m-2135m except in deserts. It visits mustard flowers in large numbers during November-December.

Life history: The yellow eggs are deposited in a cluster, scattered irregularly, on the upper surfaces of tender leaves of its food plant, the mistletoe. There may be 1-69 eggs laid on the same leaf. The egg is about 1.5 mm high and about I mm in diameter at the base. It is round, flask-shaped and narrow at the top, which is concave. The larva, on emerging, eats the egg-shell, and then moves off, closely followed by the others, to the margin of the leaf, which is nearly always an old one, and never a very young one. They commence feeding side by side, finishing one leaf after another, until full-fed. The larva measures 40 mm in length and 6 mm in breadth. Its body is greasy and greenish-yellow-brown. It is badly parasitized by dipterans. The pupa is about 25 mm in length and 7mm in breadth. Its surface is smooth, shiny, and of a slightly greenish light yellow.

Food-plants: *Dalbergia sissoo* (Shisham), *Dendrphthoe elastica, D. falcata, Ficus glomerata* (Gular, Dumur), *Loranthus* sp., *Mangifrea indica* (Mango), *Scurrula* sp., *Viscum* sp.

Distribution: **India**: Punjab, Lower slopes of Himalaya, Peninsular India. Elsewhere: Sri Lanka.

Status: Common.

27. *Hebomoia glaucippe* (Linnaeus)

Papilio glaucippe Linnaeus, 1758.

Hebomoia glaucippe (Linnaeus): Bigham, 1907; Evans, 1932; Talbot,1939; Wynter-Blyth,1957; Varshney, 1993.

Common name: Great Orange Tip.

Diagnostic characters: Upperside white with fore wing broadly orange tipped and pointed.

Morphological characters: **Male-** *Upperside* white or yellow; fore wing with apical half black bearing a large orange patch, the latter entering the end of cell; the extension of the black area proximally of the orange patch is variable; hind wing with or without a few anterior marginal spots. *Underside* of fore wing with proximal area white and apical area mottled brownish or red; hind wing with apical area as in fore wing, a prominent deep brown or blackish line from base to outer margin, passing through middle of cell. **Female-** like a male but *upperside* of fore wing with the orange patch smaller, the black spots on its distal part enlarged and often cutting off a series of submarginal orange spots, proximal area yellowish and with black dusting; hind wing with black dentate outer border and in addition a postdiscal row of prominent black spots present on hind wing.

Hebomoia glaucippe glaucippe- Male (Upperside)

Hebomoia glaucippe glaucippe- Male (Underside)

Variation: The species is variable and occurs in two seasonal forms-WSF and DSF. There are three subspecies found in India.

i) *H. glaucippe australis* Butler - WSF-Male- fore wing with inner black edging to apical orange patch narrow and hind wing with a prominent black costal spot. Underside hind wing with dark brown mottling. Female-upperside black markings less extended and inner black edging to orange patch more reduced.DSF-Male-inner black edging to orange patch obsolete and hind wing without any black costal spot. Underside hind wing much paler and with less dark brown mottling. Female-upperside black markings less extended and inner black edging to orange patch more reduced; hind wing upperside entirely white. Underside paler. Peninsular India. Sri Lanka.

ii) *H. glaucippe glaucippe* (Linnaeus) - WSF- Upperside creamy white in male and with a slight greenish tinge in female. Inner black edging to apical orange patch broad. Hind wing upperside entirely white. DSF-fore wing with more falcate apex and upperside pure white. Hind wing in male with black markings obsoletebut in female with with smaller spots. Assam (Cachar), "Bengal"

iii) *H. glaucippe roepstorfii* Wood-Mason- Inner sulphur-yellow suffusion along the inner margin of apical orange patch and over the tornal area. Upperside of fore wing with lower discal area and outer half area of hind wing suffused with pure sulphur-yellow. Andaman Islands.

Wing expanse: Male, female 80-100 mm.

Habits: This species is a largest and of most powerful flight of all the pierids found in India. During flight the wings are partially brought together over the back and also when sailing down from a height they hold the wings motionless and half closed. When at rest on the ground or any drab-coloured surface the butterfly is invisible as the colour of hind wing pattern blending so well with the surroundings. They are fond of sun and feeding from flowers and drinking from damp patches.

Habitat and ecology: It is found in fairly heavy rainfall, forested

and hilly areas. In South India, it flies to elevations of 2100m but its flight not extending to such altitude in the north.

Life history: The eggs are laid singly on the upperside of a leaf usually on an old one close to the ground. The egg is elongate, three times as long as broad with 11-12 longitudinal ribs, of which each alternate one forms a sharp tooth at the top of the egg. At first the egg is shining white with a pink shade but turning yellow later. The newly-hatched larva eats the egg-shell. The body of larva has the dorsal half-segments convex, the ventral ones flattened; anal segment projecting over the anal claspers, narrowed, truncate, with a slight indentation in the centre of extreme margin. It is glaucous-green, lighter in the spiracular region, with a beaded, white, subspiracular line from segment 13 to the head; the lower half of the beads on this line is orange except on segment 3, where it is blue; through each one of the transverse tubercles runs a short, longitudinal, purple line. Length, 47 mm; breadth, at segment 3, nearly 8 mm. The larva pupates on the underside of a leaf well hidden near the ground or close to the stem. The shape of pupa is that of *Catopsilia*. Its head process is conical at base, cylindrical anteriorly, slightly up-turned at tip, and very rugose. Cremaster narrow-triangular, bifid At end, extensor ridges rugose, strong and ventral. Ground-colour dark yellowish-green; dorsum and a lateral head- band purple; a large dorsal spot on segments 4, 5, and 9. Length, 37.5 mm. ; breadth, 9.4 mm at the shoulders.

Food-plants: *Capparis moonii, Capparis spinosa* (Kabra), *Crataeva nurvala* (Barna, Barun), *C. religiosa.*

Distribution: India: Assam, Himalya, Peninsular India, West Bengal. Elsewhere: Bangladesh, Myanmar, Nepal, Sri Lanka.

Status: Common.

28. *Ixias pyrene* (Linnaeus)

Papilio pyrene Linnaeus, 1764.

Ixias pyrene (Linnaeus): Bingham, 1907; Evans,1932; Talbot,1939; Wynter-Blyth,1957; Varshney, 1993.

Common name: Yellow Orange Tip.

Diagnostic characters: Upperside yellow or white wing with black and orange tip.

Morphological characters: **Male:** *Upperside* yellow; fore wing with costal border and more than outer half black, a large orange band present nearer the cell than to apex, and entering the end of the cell; hind wing with a black border, the latter reduced or absent in DSF. *Underside* paler yellow and speckled with fuscous brown; both wings with a discocellular spot and a submarginal row of blackish brown spots, the latter more or less in the form of ocelli but these blackish brown spots reduced or absent in WSF; fore wing usually with a black tornal spot of variable size. **Female:** like male but *upperside* yellow or when white, the band on fore wing also white; fore wing with the band usually interrupted at vein 4, the patches in areas 2 and 3 more elongate and each bearing a small black spot, outer black area sometimes extended over the whole wing; hind wing with the outer black border wider than in male.

Ixias pyrene sesia- Male (Upperside)

Ixias pyrene sesia- Male (Underside)

Variation: This species is highly variable and its three subspecies occur in India.

i) *Ixias pyrene sesia* (Fabricius) - **Male-**Fore wing with orange band broader and black area broader and reaching base of area 3. Hind wing outer border black and wider. **Female-** yellow; fore wing

with band yellow and may be tinged with orange. The WSF f. *sesia* (Fabricius) shows slight variations. DSF forms are f. *pirenassa* Wallengren and f. *jhoda* Swinhoe, the latter being extreme DSF."Bengal", Peninsular India.

ii) *Ixias pyrene kausala* Moore - Like *sesia* (Fabricius). **Male**-yellow colour rarely extending into base of area 3 on fore wing but filling a half to two-thirds of area 2. **Female-** Often white. WSF is f. *satadra* Moore. Of the f. *kausala* Moore and f. *pygmaea* Moore the latter is the extreme DSF. Kumaon, "Punjab",United Provinces. Elsewhere: Baluchistan, Chitral, Sind.

iii) *Ixias pyrene familiaris* Butler- **Male-** Usually larger than that of other subspecies. Upperside fore wing with yellow ground colour not entering base of area 3 and only the extreme base of area 2. **Female**- highly variable. White ground colour may be suffused with black and the apical band white or the ground colour may be yellow and the band white. Assam, Sikkim.

Wing expanse: Male, female 50-60 mm.

Habits: It has low erratic flight. In South India, white form of female is predominant but in other parts of India the yellow form is predominant. It is fond of flying in thorny shrubs. The male is found in large numbers on damp patches.

Habitat and ecology: It is found mainly in scrub regions at the foot of big hills and all over some of the lower hill ranges. In South India, it is not found higher than the region at the foot of the ghats.

Life history: The eggs are usually somewhat bottle-shaped. The eggs when first laid are pearl-white and shiny and, later on, turning pale cream-colour, with pink blotches and spots. The 5th instar larva is dark grass-green, covered with small dull red dots. It measures about 27 mm in length and 4-5 mm in breadth. The pupa is light green, with darker mottlings of round dots and spots or it may be bone-coloured with the markings black or dusky. It is about 20 mm in length, 5 mm in breadth at the middle and the snout being1.0mm.

Food-plants: *Capparis sepiaria.*

Distribution: India, Andaman & Nicobar Islands, Assam, Gujarat, North-west Himalaya, Peninsular India, Punjab, West Bengal. Elsewhere: Bangladesh, China, Japan, Malay Peninsula, Myanmar, Pakistan, Sri Lanka, Taiwan.

Status: Common.

29. *Pieris brassicae nepalensis* Doubleday

Pieris brassicae var. *nepalensis* Doubleday, 1846.

Pieris brassicae (Linnaeus): Evans, 1932; Wynter-Blyth,1957; Varshney, 1993.

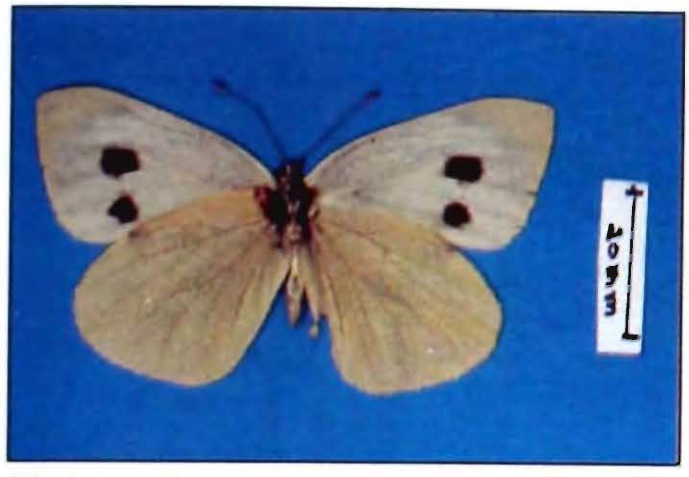
Pieris brassicae nepalensis Doubleday: Talbot, 1939.

Common name: Large Cabbage White.

Diagnostic characters: Upperside creamy white; fore wing apical black reaching vein 2, two black discal spots present in female but not in male and hind wing with a black apical spot.

Morphological characters: **Male**-*Upperside* creamy white; fore wing irrorated with blackish at base and along costa for a short distance, apex and outer margin broadly black above vein 2 and inner edge of this black area being regular and evenly curved, no discal spot, a small longitudinally narrow black spot in area 3 and sometimes small spots at ends of veins present; hind wing uniform, irrorated with black at base and a large subapical costal spot and margin slightly black anteriorly. *Underside* fore wing white, slightly irrorated with black at base of cell and along costa, apex light ochraceous brown, a large black spot in outer half of area 1 and another quadrate black spot at the base of area 3; hind wing light ochraceous brown, closely irrorated with black, with costal spot

Pieris brassicae nepalensis- Male (Upperside)



Pieris brassicae nepalensis- Male (Underside)

usually prominent. **Female-** *upperside* like that of male but basal black irroration more extended, fore wing with black apical and black margin broader with inner edge of this black area being less evenly curved, a large black spot in outer half of area 1b and another near base of area 3 present and hind wing bearing a much larger costal black spot. *Underside* like male but apical and entire hind wing light ochraceous yellow and fore wing havingmch larger discal spots.

Variation: This subspecies is bivoltine and variable. The individuals of summer are usually larger with the underside of hind wing lighter yellow and less irrorated with black. The upperside of female is rarely with a yellow tinge on hind wing.

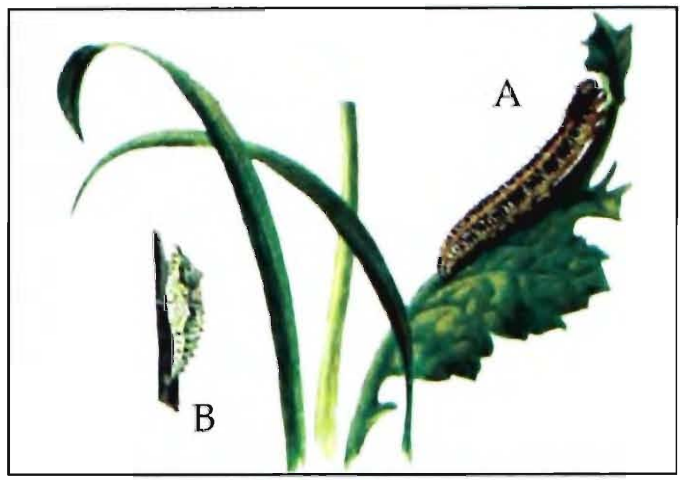
Only a single subspecies, *Pieris brassicae nepalensis* Doubleday occurs in India.

Wing expanse: Male, female 55-75 mm.

Habits: This butterfly is fast flier than other *Pieris* species and it has migratory habits. It visits flowers and prefers open or lightly wooded regions. Some individuals migrate from the Himalaya to the plains in the early winter, rear a succession of broods there and return in May. In the hills, they disappear during the coldest winter months except for the aged individuals, but reappear in February, as the first butterfly to hatch out in the new year. The males sometimes settle in vast number on wet patches and damp road but the females do not. Both sexes go to rest on the underside of leaves during the heat of the day.

Habitat and ecology: It occurs in Himalaya and plains at the of foot of Hills of Assam. It flies at elevations of 1000-4000m but in winter

and early spring months it occurs in the plains adjoining the Himalaya.



Figs. A,B. *Pieris brassicae,* A- Larva, B- Pupa

Life history: The eggs are yellow, placed singly or in groups of 15-20. The larva (Fig. A) is bluish-green, with black dots and yellow dorsal and lateral stripes; venter grey and dotted with black. The pupa (Fig. B) is yellowish-green, with black spots and dots. The head process is obtuse and there are several small dorsal tubercles. Both the larvae and pupae are much infested by ichneumons.

Food-plants: *Brassica campestris* (Rape and Mustard), other garden Brassicaceae (Cabbage, Cauliflowers, etc.).

Distribution: India: Assam, Bihar, the plains adjoining the Himalaya, Karnataka, Punjab, Sikkim, Tamil Nadu. Elsewhere: Bhutan, Europe, Pakistan , Tibet, Turkestan, Yunnan.

Status: Very common.

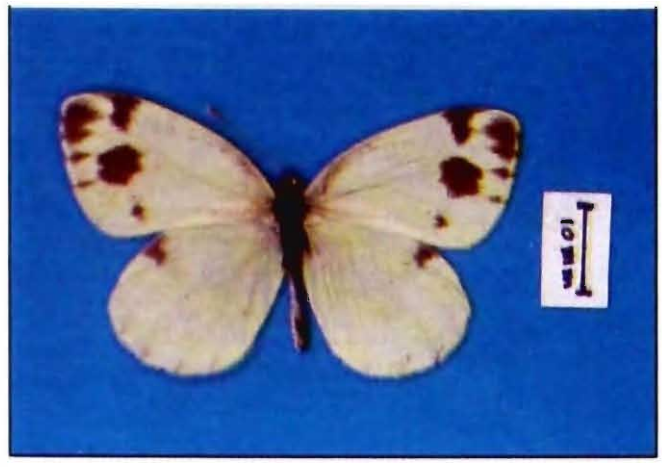
30. *Pieris krueperi devta* (de Niceville)

Mancipium devta de Niceville, 1883.
Pieris krueperi devta (de Niceville): Bingham, 1907; Evans, 1932; Talbot, 1939; Gupta & Mondal, 2005.
Pieris krueperi (Staudinger):Wynter-Blyth, 1957; Varshney, 1993.

Common name: Green Banded White.

Diagnostic characters: Uppreside of fore wing with a triangular black subapical patch touching the black apical area.

Morphological characters: **Male-** *upperside* fore wing with base of costa irrorated with black, a costal triangular black patch, usually touching the black apical area; black marginal and triangular,



Pieris krueperi devta- Male (Upperside)

inwardly pointed calescent spots on veins 3 to 5, a large black spot in area 3 often joining marginal spot; hind wing with a black subapical costal spot and indistinct small marginal spots. *Underside* of fore wing as on upperside but the outer marginal area faintly ochraceous or greenish yellow; hind wing basal two thirds irrorated more or less thickly with black (exception of a short, very broad, inwardly oblique band of the ground colour that extends from the middle of the costa to within the upper portion of cell), the outer edge of the dusky area transverse from costa to area 5, then curved outwards to vein 4 and obliquely inwards to vein la, black marginal vein spots more or less prominent. **Female-** *upperside* like male but fore wing with black markings broader and prominent and extended lower along the margin than in the male; hind wing with slightly larger costal spot and rarely some marginal indistinct small black vein spots. *Underside* as in male but an additional black spot in area l small and spot in area 3 very large; hind wing with diffuse marginal spots, the latter more or less continuous or coalescent and washed with greenish.

Pieris krueperi devta- Male (Underside)

Variation: The marginal spots on hind wing may be very large. Only a single subspecies, *Pieris krueperi devta* (de Niceville) is found in India.

Wing expanse: Male, female 50-55 mm.

Habits: The butterfly flies in June.

Habitat and ecology: It occurs in desolate alpine plateaux and artificial meadows. It ascends to 2800m.

Distribution: India: Jammu & Kashmir (Ladak). Elsewhere: Pakistan (Baluchistan)

Status: Critically Endangered (Gupta and Mondal, 2005). This subspecies is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY COLIADINAE

Body robust. Antennal club gradual with a raised line present. Palpi with third segment very short, underside of palpi smoothly scaled or rarely clothed with bristles and hairs. Wing colouration usually yellow or orange; fore wing with vein 6 always emitted from 7, veins 7 and 8 coincident; hind wing with the precostal vein greatly reduced or absent.

31. *Catopsilia pomona* (Fabricius)

Papilio pomona Fabricius, 1775.

Catopsilia pomona (Fabricius): Evans, 1932; Talbot, 1939; Wynter-Blyth, 1957; Varshney, 1993.

Common name: Lemon Emigrant.

Diagnostic characters: Upperside of wings with ground colour white and proximal areas yellow; fore wing black at apex and with a marginal narrow border macular.

Morphological characters: **Male-** *upperside* of both wings with ground colour white and the proximal areas yellow; fore wing with costal margin black at apex and outer marginal narrow border macular.*Underside* greenish white and both wings with a discocellular silvery spot ringed with reddish brown; fore wing sometimes with a postdiscal irregular reddish brown line, more or less distinct, running from the costa obliquely outwards to vein 7, and then obliquely inwards to vein 2; hind wing at base of area 5 with a second spot like the one on the discocellular, sometimes a postdiscal series of small

Catopsilia pomona- Male (Upperside)

reddish brown spots, more or less distinct and marginal reddish brown vein dots. **Female-** like male but *upperside* sulphur yellow to white; fore wing with costa only black for about the apical third or less, outer marginal black border much narrow and its inner edge more dentate, sometimes macular, an anterior postdiscal series of blackish brown spots, sometimes reaching area 1b and a prominent rounded discocellular spot blackish brown; hind wing with small blackish or reddish brown marginal vein spots. *Underside* as in male but ground colour variable being reddish brown, ochraceous, deep yellow to greenish-yellow or white, markings prominent; fore wing in darker forms with reddish brown apical and marginal border.

Catopsilia pomona- Male (Underside)

Variation: It shows variation in ground colouration on upperside and underside, markings on both wings, etc., thereby giving rise to several following forms.

f. *crocale* (Cramer)- Upperside fore wing with costa, apex and termen with narrow and continuous black border in male but broader in female.

Male: f. *hilaria* (Stoll) - Upperside with yellow proximal and white distal areas.

Female: f. *catilla* (Cramer) - Underside ground colour yellow to ochraceous, both wings with a reddish-purple discal patch, the latter larger on hind wing.

Female: f. *bidotata* (Fruhstorfer) - Underside hind wing with two large subcostal reddish-purple patches.

Female: f. *siscia* (Fruhstorfer)- Underside ground colour white; markings as in f. *catilla*.

Female: f. *nivescens* (Fruhstorfer) – Upperside and underside with ground colour white.

Wing expanse: Male, female 55-75 mm.

Habits: Its flight is poweful and rapid and it proceeds in a series of upward and downward curves. It is fond of settling on flowers and it is found in large numbers in gardens in plains during and after rains. The males also settle on damp patches freely, often in swarms. It is a pest of *Cassia fistula* and *C. siamea*.

Habitat and ecology: They are at home in all sorts of terrain except deserts and are found at elevation of 2450m in the hills. In north west Himalaya, they appear in the monsoon and post-monsoon months. In wetter parts of India, they are found throughout the year.

Life history: The egg is white at first and turning yellow later. The larva is bright green and it measures about 41 mm in length and 5 mm in breadth. The pupa is of the normal smooth type, with slight ventral wing-bulge and tail suspension. Its colour is usually green. The pupa is about 28 mm in length, 7 mm in breadth at segment 7 and snout 2 mm in length.

Food-plants: *Bauhinia racemosa* (Kachnal, Ashta), *Butea monosperma* (Flame of the Forest, Dhak, Palas), *Cassia auriculata* (Tarwar), *C. fistula* (Amaltas, Girimalh), *C. grandis*, *C. javanica*, *C. nodosa*, *C. occidentalis* (Negro Coffee), *C. siamea* , *C. tora* (Chakunda, Panevar), *Diosyros discolor* (Wild Chakaur), *Oryza sativa* (Paddy, Rice).

Distribution: India: Andaman & Nicobar Islands, Punjab, widely distributed in India. Elsewhere: Indo-Australian Region.

Status: Very common.

32. *Catopsilia florella gnoma* (Fabricius)

Papilio gnoma Fabricius, 1776.

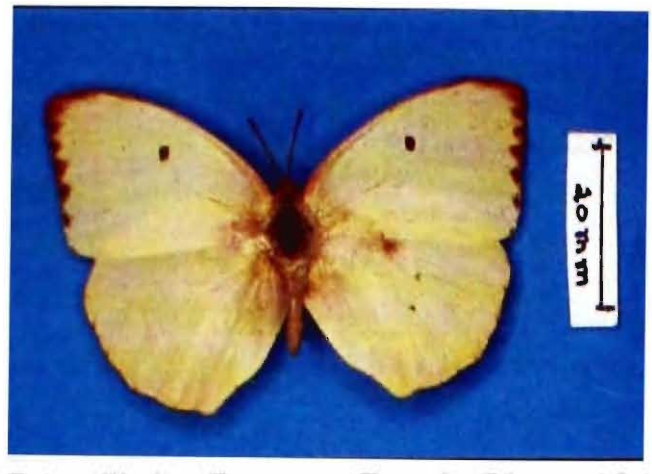
Catopsilia florella gnoma (Fabricius): Evans, 1932; Talbot, 1939.

Catopsilia florella (Fabricius): Bingham,1907; Wynter-Blyth, 1957.

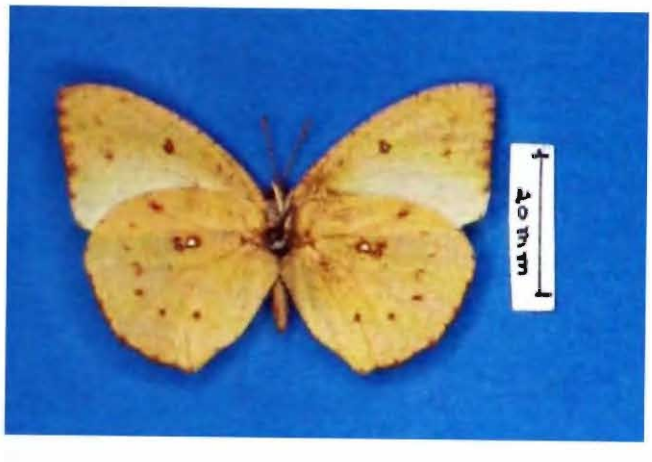
Common name: African Emigrant.

Diagnostic characters: Upperside white, fore wing with marginal dark border below apex macular narrow and sometimes brown.

Morphological characters: **Male-** *upperside* white with reddish brown markings; fore wing with slight apical costal edging and marginal vein spots reaching veins 3 or 2, and a black discocellular spot present; hind wing usually with a marginal yellowish-pink line. *Underside* as in *C. pyranthe pyranthe*, but with more prominent and silvery discocellular spots. **Female-** *upperside* greenish yellow, reddish brown markings more distinct and always present than in male, discocellular spot larger; hind wing with small reddish brown marginal spots. *Underside* as in male, but strigae and other markings more prominent and reddish brown; hind wing with three discal silvery spots including the discocellular one.



Catopsilia florella gnoma- Female (Upperside)



Catopsilia florella gnoma- Female (Underside)

Variation: It shows markings variable in size and sometimes absent on upperside of fore wing. Only a single subspecies, *Catopsilia*

florella gnoma (Fabricius) occurs in India and it has a follwing extreme DSF.

f. *thisorella* (Boisduval)- Upperside and underside of both wings with discocellular spots minute and upperside fore wing markings vestigial or absent.

Wing expanse: Male, female 50-70 mm.

Habits: This species has a zig-zagging flight. A large and very common Mason Wasp takes a great toll of its larvae.

Habitat and ecology: It appears in October and becoming abundant in November in Gujarat. It does not ascend much in Himalaya and rarely flying upto elevations of 2000m in Shimla.

Life history: The larva is pea green, with distinct orange coloured lateral stripe, lightly sprinkled with black; horn on the head reddish brown.

Food-plants: *Cassia auriculata* (Tarwar), *C. fistula* (Amaltas, Girimalah), *C. nodosa, C. occidentalis* (Negro Coffee), *C. tora* (Chakunda, Panevar).

Distribution: India: Andaman & Nicobar Islands, Andhra Pradesh, Gujarat, Maharashtra, North-West Himalaya, Rajasthan, Tamil Nadu, Uttarakhand. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Very common.

33. *Catopsilia pyranthe pyranthe* (Linnaeus)

Papilio pyranthe Linnaeus, 1758.

Catopsilia pyranthe (Linnaeus): Bingham,1907; Wynter-Blyth, 1957; Varshney, 1993.

Catopsilia pyranthe pyranthe (Linnaeus): Evans, 1932; Talbot; 1939.

Common name: Mottled Emigrant.

Diagnostic characters: Fairly large. Upperside white or greenish and hind wing with marginal dark border below apex continuous and often broad.

Catopsilia pyranthe pyranthe-Male (Upperside)

Morphological characters: **Male-** *upperside* chalky white or greenish; fore wing with a discocellular black spot; costa edged with black, an outer marginal black border, wide at apex and narrowing slightly to the tornus, inner edge of th border slightrly produced on the veins; hind wing with marginal black vein dots or with a continuous narrow border. *Underside* greenish with reddish brown strigae and small discocellular spots. **Female-** *upperside* as male but all black markings broader; fore wing with discocellular spot larger, an anterior, short and black post discal band, the latter sometimes much widened and partly or completely coalescing with the marginal border; hind wing with marginal narrow black band, usually some anterior postdiscal spots. *Underside* with discocellular spots better defined, with an outer red ring encircling a silvery spot; both wings with a postdiscal series of reddish brown spots; hind wing with one or two similar spots on each side of the discocellulars.

Variation: Only the nominate subspecies occurs in India which is variable with the following typical form of female, the latter being rather an extreme WSF.

Female f. *minna* Herbst- Upperside of fore wing with a heavy postdiscal line and underside of hind wing more greenish and without discocellular or other spots.

Wing expanse: Male, female 50-70 mm.

Habits: This species is migratory and its flight being zig-zagging. It is abundant on garden flowers. A large and very common Mason Wasp takes a great toll of its larvae.

Habitat and ecology: This nominate subspecies occurs at elevations of 2135m.

Life history: The eggs are spindle-shaped and white at first and later on, turning yellow. The egg is narrowly truncate at the top, having 12 longitudinal ridges which do not form teeth at the top, although they all reach the edge. The larva is very similar to that of *crocale* except that there are tubercles on the venter. It is dark grass –green with the head lighter and venter green. The pupa is like that of *crocale*. Its head is produced into a short, perfectly straight snout which is short and pyramidal in shape. It is dark green and lighter on venter, a yellow dorsal line on thorax and a similarly yellow supra-spiracular line from end to end. The pupa is 22.5 mm in length and 6 mm in breadth at segment 7.

Food-plants: *Bauhinia racemosa* (Kachnal, Ashta), *Brassica* spp., *Butea monosperma* (Flame of the forest, Dhak, Palas), *Capparis* spp., *Cassia auriculata* (Tarwar), *C. fistula* (Indian luburnum, Amaltas, Girimalh), *C. javanica, C. nodosa, C. occidentalis* (Negro Coffee), *C. tora* (Chakunda, Panevar), *Loranthus* sp. (Weed Chakaur), *Sesbania bispinosa* (Daincha), *S. grandiflora* (Agathi, Swamp Pea, Sesban), *S. sesban* (Common Sesban).

Distribution: India: Andaman & Nicobar Islands, Assam, Gujarat, Punjab, Rajasthan, Tamil Nadu, Uttarakhand. Elsewhere: Australia, China (Hainan), Indonesia (Borneo, Celebes), Java, Pacific, Pakistan, the Philippines, South China, Sri Lanka and Taiwan.

Status: Very common.

34. *Colias fieldi* Menetries

Colias fieldi Menetries, 1855.
Colias croceus fieldi Menetries: Bingham, 1907; Evans, 1932.
Colias electo fieldi Menetries: Talbot, 1939; Mandal, 1984.
Colias electo (Linnaeus): Wynter-Blyth, 1957.
Colias fieldi Menetries: Varshney, 1993.

Common name: Dark Clouded Yellow.

Diagnostic characters: Upperside bright orange in male but often

orange pinkish in female, broad black borders and fore wing with a prominent spot at end of cell and hind wing with a yellow brand at base of area 7.

Colias fieldi-Male (Upperside)

Morphological characters: Male –*Upperside* deep cadmium orange yellow; fore wing with a basal greenish black patch, a discocellular black pear shaped spot, a broad outer black border broader at apex and tornus than in middle, its inner edge curved slightly and irregularly crenulate, the distal portions of veins 6,7, 9 and 10 submarginally pale and conspicuous on the apical black; hind wing at base with a thin covering of long shaft hairs, beneath the latter a dusting of black scales continued outwards along the posterior part of the wing, inner margin broadly pale yellow, outer border broadly black, broader at middle and its inner edge crenulate, discocellular spot large, consisting of a small patch on which ground colour paler and brighter and enclosing two somewhat dusky rings, the upper one being minute, a sex patch of light yellow scales at base of area 7. *Underside* light orange yellow, the costal margin narrowly, outer fourth of fore wing and entire hind wing overlaid with pale dull green; fore wing with discocellular spot as on upperside but centred with silvery white, a post discal series of black spots, obsolete and curved inwards anteriorly but conspicuous and increasing in size posteriorly; hind wing with a conspicuous silvery, double,

Colias fieldi- Male (Underside)

Colias fieldi- Female (Upperside)

discocellular spot circled by a diffused salmon pink ring, followed by an almost obsolete post discal series of pinkish spots. **Female-** *Upperside* orange pinkish; fore wing with basal black dusting more extensive than in male, paricularly in hind wing, the outer black border wider with a more irregular and somewhat diffused inner edge, submarginal spots bright yellow, the anterior four small and obliquely placed and the posterior spot large; hind wing with discocellular spot without the central dark rings (conspicuous in male), an abscure post-discal curved series of yellow spots bordering the outer black border. *Underside* as in male.

Variation: It is varies in size and wing markings. It shows following seasonal variation.

Colias fieldi- Female (Underside)

i) WSF- Male- Upperside of wings marginal border narrow but tapering more towards tornus in hind wing.Underside hind wing with the discal spot posteriorly rounded and smaller than in DSF and postdiscal series of spots prominent.

ii) DSF- Male- Upperside of wings marginal border anteriorly wide but wider in female. Underside hind wing with the discal spot posteriorly subquadrate and large than in WSF, postdiscal series of spots obsolete or absent and marginal border narrowing towards the tornus abruptly than in fore wing.

The smaller individuals occurring in North-west India are usually

referred as *edusina* C.& R. Felder and larger ones found in Assam and Myanmar but similar ones sometimes are also found in North-west India.

Wing expanse: Male, female 45-65 mm.

Habits: This species is the most primitive in the family Pieridae (Mandal,1984). It flies quickly, low over the grass in open grassy places. It often settles on low growing flowers. In winter, some migrate to the plains.

Habitat and ecology: It occurs in Himalaya and hills of Assam. It flies at elevations of 900-4850m. It is one of the very few butterflies that is common throughout the year.

Food-plants: *Caltha palustris* (Mumuri), *Gentiana carinata, Gentiana* sp., *Indigofera dosua, Taraxacum officinale* (Common Dandelion).

Distribution: India: Assam, North-west India, Punjab, Sikkim, Western Himalaya. Elsewhere: Northern Myanmar, Pakistan.

Status: Common.

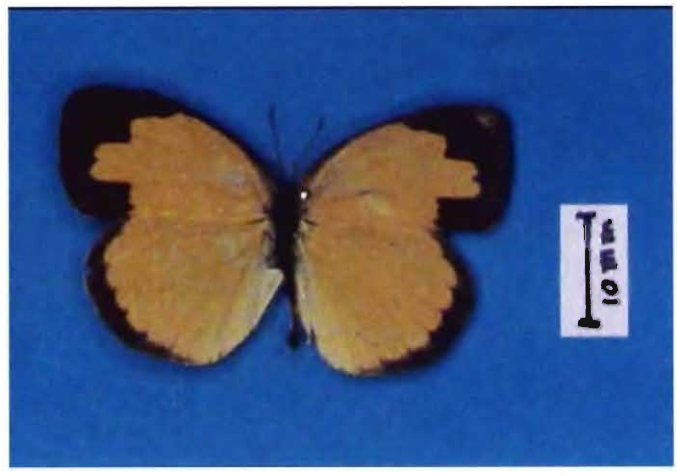
35. *Terias hecabe* (Linnaeus) 1758

Papilio hecabe Linnaeus, 1758.
Terias hecabe (Linnaeus): Bingham, 1907; Evans, 1932; Wynter-Blyth, 1957; Varshney, 1993.
Eurema hecabe (Linnaeus): Talbot, 1939.

Common name: Common Grass Yellow.

Diagnostic characters: Upperside yellow, with black borders; fore wing black border often continued along vein la. Underside of fore wing with two spots in cell or these spots absent but one or three spots rare, sex brand usually present in male.

Morphological characters: **Male** - *Upperside* yellow; forewing with a deep black outer border, continued narrowly along costal margin to base, inner edge of the border from costa to vein 4 very oblique and irregular and excavated between veins 2 and 4, this excavation



Terias hecabe conturbernalis- Male (Upperside)

outwardly rounded between the veins and inwardly toothed on vein 3, below vein 2 black area suddenly dilated into a square spot, the latter occupying the whole of the tornal angle, the inner edge of this projection being slightly incurved; hind wing with an outer narrow black border, the latter attenuated anteriorly and posteriorly, this border varying in width and its inner edge sinuate, inner margin broadly paler than the ground colour. *Underside* usually paler than upperside; both wings with minute reddish brown costal and outer marginal vein specks; fore wing with two small spots on basal half of cell or these spots absent but one or three spots rare. **Female-** *upperside* like male but black marginal borders slightly broader, inner edge band on hind wing diffused. *Underside* as in male.

Terias hecabe conturbernalis- Male (Underside)

Variation: This species is highly variable and its five subspecies are found in India.

i) *Terias hecabe contubernalis* (Moore)- variable in colour from sulphur to rich lemon yellow according to the locality having a light or heavy rainfall. The female f. *lacteola* (Distant) is white. DSF- upperside as in WSF but hind wing border sometimes narrower and diffused inwards. Underside as in WSF but spos larger, more clearly defined, darker and prominent with black irroration; fore wing with a subapical, conspicuous elongate spot or short bar of reddish brown extending downwards from the costa, this spot being irreugular

in shape and varying in width but never reaching the margin, sometimes a small reddish brown spot in area 1b present near the tornus. "Bengal", Sikkim. Malay Peninsula, Myanmar.

ii) *Terias hecabe simulata* (Moore) - Smaller with ground colour darker yellow. Underside fore wing with aprominent subapical pach and hind wing markings more or less reddish brown. In extreme WSF these brown makings absent. In DSF f. *asphodelus,* upperside with slightly narrower borders but in extreme DSF borders much narrower. UsuallyPeninsular India, Central Provinces. Sri Lanka.

iii) *Terias hecabe fimbriata* (Wallace) - Upperside of fore wing with very narrow black and somwhat dentate border; hind wing bearing marginal dots. In extreme DSF f. *apicalis* (Moore), fore wing with black border restricted to apex and posteriorly represented by black vein dots. Kumaon. Chitral, "Punjab"

iv) *Terias hecabe blairiana* (Moore) - Upperside fore wing with broad black outer border and very narrow black narrow costal edging. Underside of fore wing with narrow subapical bar in male but its indications only in female. Andaman Islands.

v) *Terias hecabe nicobariensis* (Moore) – Upperside paler; fore wing with border restricted. Underside fore wing with or withhout sparse red-brown markings. Nicobar Islands.

Wing expanse: Male, female 40-50 mm.

Habits: The butterfly flies close to the ground. It visits flowers freely and frequents damp places in the hot months.

Habitat and ecology: It is very common and found throughout India. It is abundant in the shady extensive forest of the hills and in the open hot plains. It occurs throughout the year up to elevations of 2800m except in the extremes of the climate and in north-west Himalaya where it appears during August-September and in Sikkim in December.

Life history: The eggs are laid singly on young shoots and leaves. The eggs are white when laid and quickly becoming yellow. The egg is spindle-shaped with the top bluntly pointed. Its surface bears many very fine longitudinal ribs and transverse striae The larva is dark

green, mostly glaucous on the sides and with a spiracular narrow white band from head to end of anal flap. It feeds upon leguminose plants.The full grown larva is about 22 mm in length and 3 mm in breadth.The pupa is usually green, with a rather dark violet-grey dorsal line. It is about 17 mm in length and 3.5 mm in breadth.

Food-plants: *Acacia* sp., *Albizia procera (Safed Siris), Albizia* spp., *Caesalpinia spicata, Caesalpinia* spp., *Cassia fistula* (Indian Laburnum, Amaltas, Girimalah), *C. mimosoides, C. tora* (Chakunda, Panevar), *Moullava spicata, Pithecellobium dulce* (Madras Thorn, Quamachil), *Senna obtusifolia, Sesbania cannabina* (Daincha, Prickly Sesban), *S. grandiflora* (Agathi, Swamp Pea, Sesban), *S. sesban* (Common Sesban).

Distribution: India: Andaman Islands & Nicobar Islands, Chhattisgarh, Madhya Pradesh, Peninsular India, Punjab, Sikkim, Uttarakhand, West Bengal. Elsewhere: Bangladesh, the Ethiopian and Indo-Australian region, Korea and Japan.

Status: Very common.

FAMILY NYMPHALIDAE

Antennae completely or partially scaled. Palpi not more than twice as long as the head except in Libytheinae. Fore wing with all the veins present, one vein usually dilated at base, 10 arising nearer apex of cell of wing, vein 1b may or may not be bifurcated at base. Hind wing cell closed by a tubular or non-tubular vein, precostal vein present. Fore legs imperfect in both sexes and not used for walking except in the female of Libytheinae. In male, fore tarsus tarsus always reduced to a single segment clothed with hair like scales resembling a small brush; in female fore tarsus with a variable number of segments.

SUBFAMILY DANAINAE

Antennae not scaled; eyes naked; fore legs imperfect, useless for walking in both sexes; both wings ample and margin not dented or curved, cells of both wings closed by tubular veins; fore wing with all veins present, vein 1b bifurcated at base, hind wing with precostal vein present.

36. *Danaus chrysippus chrysippus* (Linnaeus)

Papilio chrysippus Linnaeus, 1758.

Danais chrysippus (Linnaeus): Bingham, 1907; Evans, 1932; Wynter-Blyth, 1957.

Danaus chrysippus chrysippus (Linnaeus): Talbot, 1947.

Danaus chrysippus (Linnaeus):Varshney, 1993.

Common name: Plain Tiger.

Diagnostic characters: Upperside of wings tawny; fore wing with white spots on black apical area.

Morphological characters: **Male**- *Upperside* of wings tawny; fore wing with apical third black, extending narrowly along costa to base and on outer margin to the tornus, one or two white spots beyond and above apex of cell, two small white costal spots, a white subapical band of four spots, below this band one inner and two submarginal

white spots, a postdiscal spot white spot in area 2, black outer margin with white spots and dots prominent in the middle; hind wing yellowish brown, with narrow outer black border crenulate on its inner edge and bearing white spots below vein 5 to tornus, four small black spots around end of cell, one black discal spot (sex patch) below vein 2 and three black spots on discocellulars. *Underside* like that of upperside but paler, fore wing with apical area ochraceous and subapical band of five white spots; hind wing ground colour ochraceous, white markings and spots prominent, costa bearing three white and four black spotst. **Female-** like that of male but three black spots around end of cell.

Danaus chrysippus chrysippus- Female (Upperside)

Danaus chrysippus chrysippus- Female (Underside)

Variation: Only the nominate subspecies occurs in India. It shows variation in isize of black and white markings on wings.

It has following four forms in India.

a) f. *amplifascia* Talbot - Fore wing upperside with extended white markings, apical band broader confluent with costal spots and spots beyond end of cell. Poona. Campbellpore, Hongkong, Tong-king.

b) f. *alcippoides* Fruhstorfer - Upperside of hind wing more less white. Very rare.

c) f. *dorippus* Fruhstorfer - Upperside of fore wing white- spotted Black. Rare.

d) f. *transiens* (Suffert)- Resembles f. *dorippus* but fore wing underside, and sometimes also on upperside with a subapical row of four or five white spots. Rare.

Wing expanse: Male, female 70-80 mm.

Habits: This is one of the commonest butterflies in India. It flies slow from early morning to dusk in gardens and settles on flower for nectar. In the evening, it flutters low among bushes or stems of grass to find a resting place for the night. It shows Batesian Mimicry and is mimicked by the females of the *Hypolimnas misippus* (Linnaeus) (Danaid Eggfly), *Argyreus hyperbius* (Indian Fritillary), *Elymnias hypermnestra* (Common Palmfly), the males and females of *Cethosia cyane* (Leopard Lacewing) and *Cethosia nietneri* (Tamil Lacewing).

Habitat and ecology: It is found in every type of region, including desert and upto elevation of 2750m. On the plains it is found throughout the year but it is seasonal in the Himalaya. It migrates with other danaine species.

Life history: The females are observed as beating along the hedgerows and in and out among bushes and shrubs, until their search is successful for settling at a plant to lay their eggs before choosing another plant. The males can also be seen sailing to and fro with their scent brushes exposed trying to attract a mate. One egg is laid on the underside of a leaf, where the larva lives. The yellowish egg is shaped like a sugar-loaf. The caterpillar begins its life by eating the egg shell and then proceeds to feed on the body of the leaf, leaving the upper surface. As it grows it eats from the edge of the leaf in the ordinary way. It is much attacked by ichneumons. The body of larva is dark chocolate-brown or black It measures nearly 38 mm in length, 7 mm in breadth and 6 mm in height. The larval stage lasts for 12-14 days. It goes off to pupate and fixes itself firmly on the under surface of a leaf or branch. The pupa is green or may be pale pinkish wax-white. It is protected by its resemblance to two different parts of the

plant on which it feeds and resides, the green pupae matching the leaves, and the pink ones being of a colour likely to be mistaken by birds, reptiles, and predaceous insects for a blossom. It is 18.5 mm in length and 8 mm in breadth at segment 7. The pupal stage lasts for 6-9 days.

Food-plants: *Asclepias curassavica* (Curassavian Swallow-wort, West Indian Ipecacuanha, Kakatundi, Kaura-dodi), *Calotropis gigantea* (Safed Ak), *C. procera* (Madar, Ak), *Calotropis* sp. (Common Ak), *Cryptolepis dubia* (Karanta).

Distribution: India: Punjab, widely distributed in India. Elsewhere: Asia minor, Indonesia (Borneo), Hong kong, Japan, Malaya, Myanmar, Pakistan, the Philippines, Sri Lanka, Sumatra, Vietnam.

Status: Very common.

37. *Danaus genutia genutia* (Cramer)

Papilio genutia Cramer, 1779.
Danais plexippus (Linnaeus): Bingham, 1907; Evans, 1932; Wynter-Blyth, 1957
Danaus plexippus plexippus (Linnaeus): Talbot,1947.
Danaus genutia (Cramer): Varshney, 1993
Danaus genutia genutia (Cramer): Mondal & Maulik, 1997.

Common name: Common Tiger.

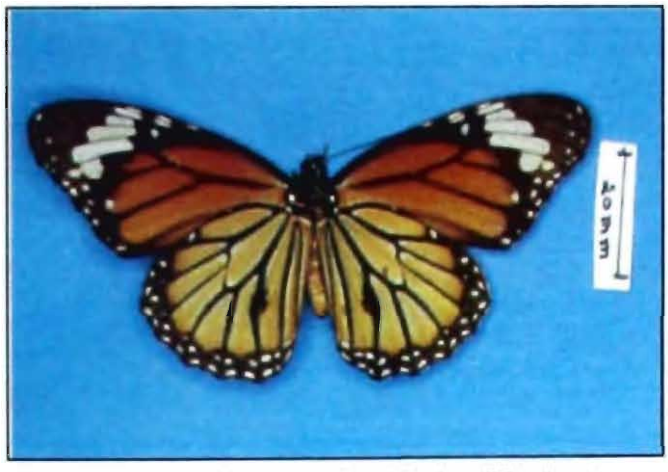
Diagnostic characters: Upperside reddish brown, with all veins broadly black, fore wing apical area black with a white band and hind wing with scent patch small

Morphological characters: **Male**- *Upperside* of wings reddish brown, fore wing with a subapical white band, apical half black, extending into the end of cell and to base of costa, along outer margin bordered with black and extending more or less to base of inner margin, submarginal and marginal series of white spots obsolete towards costa and inner margin except a small white apical spot, three small white spots beyond apex of cell to costar and a minute white spot at

Danaus genutia genutia- Male (Upperside)

middle of costa; hind wing with veins broadly black and scent patch at vein 2, outer margin with black border with inner edge crenulate and usually with a few submarginal and a complete marginal row of white dots. *Underside* mostly as on upperside, fore wing apex dusky brown, a series of submarginal white spots incomplete towards inner margin, a complete row of marginal white spots; hind wing paler, with more or less white scaling and with the veins prominently black and the black scent patch with a white spot at vein 2, rows of both the submarginal and marginal white dots complete. **Female-** as in male but lacking the black scent patch with a white spot at vein 2.

Variation: Only the nominate subspecies occurs in India. It exhibits variation in the size and extent of black and white wing markings.



Danaus genutia genutia- Male (Underside)

It has following two forms in India.

a) f. *grynion* (Fruhstorfer)- Upperside of male with ground colour pale brown or buff-brown. Underside of fore wing as on upperside; hind wing almost white. Sikkim. Myanmar (Annam).

b) f. *albipars* Talbot – Upperside and underside of both sexes with extensive white colouration. Sikkim. Myanmar (Karen Hills).

Wing expanse: Male, female 75-95 mm.

Habits: This butterfly inhabits lightly forested country and scrub jungle than the open plains. Unlike *D. chysippus*, it does not visit flowers much but rests on yellow flowers of *Crotolaria*. It has the

usual weak flight and associates with other danaines in migration. It is mimicked by the female of a Satyrine, *Elymnias hypermenestra* (Linnaeus) (Common Palmfly).

Habitat and ecology: It is abundant in regions of fairly heavy rainfall and is more active than its near relative *D. chysippus*. It is found up to elevations of 2450m in the Himalaya.

Life history: The eggs are laid singly on the underaide of a leaf, and the larva always lives there. The larva makes its first meal of the egg-shell, after which it eats tender leaves, old leaves, stalks, etc. The full grown larva is about 37 mm in length and 7 mm in breadth. Its velvety black body is marked with bluish-white and yellow spots and bluish-white lines. It wanders to pupate, fixing itself firmly to the underside of a leaf, twig, etc., for the purpoee. The pupa is green and marked with golden spots. It is about 16.5 mm in length, 7.5 mm in breadth and of 8.5 mm height at segment 7.

Food-plants: *Asclepias curassavica* (Curassavian Swallow-wort, West Indian Ipecacuanha, Kakatundi, Kaura-dodi), *Ceropegia intermedia, Ceropegia lawii, Cynanchum dalhousiae, Cynanchum liukiuense, Marsdenia tinctoria* (Riyong), *Raphistemma pulchellum, Stephanotis floribunda, Tylophora carnosa,* wild Asclepids.

Distribution: India: Andaman & Nicobar Islands, Punjab, Sikkim. Widely distributed in India. Elsewhere: Afghanistan, Annam, Myanmar, Pakistan, Riu-Kiu Islands, South China (Yunnan), Sri Lanka, Thailand, Vietnam (Tonkin).

Status: Fairly common. Locally very common.

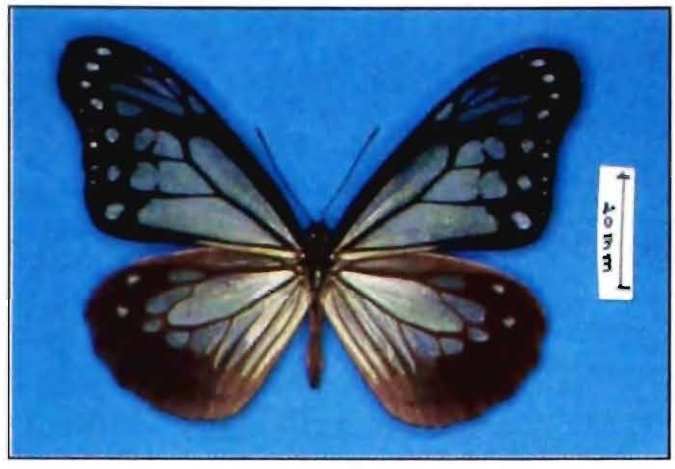
38. *Parantica sita* (Kollar)

Danais sita Kollar, 1844.
Danais tytia (Gray): Bingham,1905; Wynter Blyth, 1957.
Danaus tytia sita (Kollar): Evans, 1932.
Danaus sita sita (Kollar): Talbot, 1947.
Parantica sita (Kollar): Ackery & Vane-Wright, 1984; Varshney, 1993.

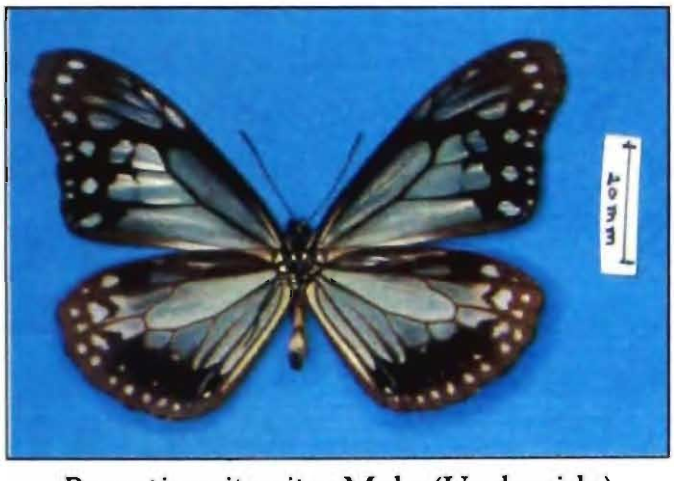
Common name: Chestnut Tiger.

Diagnostic characters: Upperside fore wing black and hind wing chestnut, white or pale bluish subhyaline markings extensive, male with a patch of scent scales in hind wing.

Morphological characters: Wings elongated. **Male-** *upperside* of fore wing black or fuliginous black bearing bluish white subhyaline markings, a basal streak from base in area la, very broad stripes filling the basal three fourth of area l b and the entire cell; five very large quadrate discal spots – two each in area 2 and 3 one in area 5, three shorter costal streaks above the two long subapical streaks, a submarginal series of more or less rounded spots decreasing in size anteriorly and curved inwards around the subapical streaks, a submarginal series of smaller spots, the latter obsolete apically. Hind wing wing chestnut- red having subhyaline markings, streaks from bases, in areas la, lb and two streaks in area lc not reaching the margin, a stripe filling the cell, five large spots around the cell and a broad streak base along costa, two postdiscal spots one each in area 5 and 7. *Underside* mostly as on upperside but markings more complete and distinct, fore wing with apical area chestnut brown; hind wing marginal border and apex light chestnut brown, a black patch of scent scales with a short white streak below vein 2, a series of postdiscal spots becoming reduced or obsolete towards inner margin and a submarginal series of spots incomplete apically. **Female-** like that of male but without any patch of scent scales in hind wing.



Parantica sita sita- Male (Upperside)



Parantica sita sita- Male (Underside)

Variation: Only the nominate subspecies occurring in India displays variation in the size and extent of wing markings.

The following four forms are found in India.

a) f. *sita* (Kollar)- Discal patches in areas 2 and 3 are united in fore wing and cell usually without a streak in hind wing.

b) f. *tytia* (Gray)- Fore wing with discal patches in areas 2 and 3 are not united and hind wing with a dark streak present in the cell.

c) f. *tira* (Fruhstorfer)- Hind wing without submarginal spots. A dark stripe absent in cell of hind wing is known in a male from Agra (Uttar Pradesh).

d) f. *pedonga* (Talbot)- Male- hind wing ground colour more ruddy than in f. *sita,* scent patch reduced and not reaching beyond fold in area 1c. Underside hind wing ground colour as on upperside, over the inner area less scaled with white particularly the stripe in area 1a. Female- underside hind wing as in male, in area 1a with or without vestiges of white scaling.

Wing expanse: Male, female 85-110 mm.

Habits: The butterfly is slow flying and visits flowers. It is found in all sorts of regions but is particularly fond of forest glades, where it beats backwards and forwards at about four metres above the ground. There is spring and autumn brood. In the Western Himalaya it has four broods- the first in April and the fourth in late October. It has a high and soaring flight. It is mimicked by *Chilasa agestor* (Tawny Mime), *Paranticopsis xenocles* (Great Zebra) of family Papilionidae and *Hestina nama* (Circe) of family Nymphalidae.

Habitat and ecology: This butterfly is common along most of the Himalaya. It ascends 900-2750m.

Life history: The white eggs are laid singly on the young leaves of *Marsdenia roylei* (Asclepiadaceae). The eggs are longitudinally ribbed, and about three times as long as broad. The emerged larva is dirty white in colour with transverse lines on each segment When full-grown, it is about 38mm long and its ground-colour is pale yellowish-

green. The pupa is pale emerald-green, with golden-yellow spots. From eggs laid in September, the imagoes emerged in the following April.

Food-plants: *Asclepias curassavica* (Curassavian Swallo-wort, West Indian Ipecacuanha, Kakatundi, Kaur-dudi), *Hoya carnosa, Pergularia roylei* (Murkula, Marua-bel), *Tylophora* sp.

Distribution: India: Arunachal Pradesh (Pedong, Mishmi Hills), Assam, Jammu & Kashmir, Sikkim, Uttar Pradesh, Uttarakhand. Elsewhere: Afghanistan, Bhutan, China, Myanmar, Thailand, South-east Tibet, Vietnam (Tonkin).

Status: Not rare.

39. *Tirumala limniace leopardus* (Butler)

Danais limniace var. *leopardus* Butler, 1866.
Danais limniace (Cramer): Bingham, 1907; Wynter-Blyth, 1957.
Danais limniace mutina Fruhstorfer: Evans, 1932.
Danaus limniace leopardus (Butler): Talbot, 1947.
Tirumala limniace (Cramer): Ackery & Vane-Wright, 1984; Varshney, 1993.

Common name: Blue Tiger.

Diagnostic characters: Tailless. Upperside of wings black or dark brown bearing with numerous large, bluish white, semitransparent spots, blotches and streaks.

Morphological characters: **Male-** *Upperside* of wings black with bluish white semi-hyaline spots and streaks; fore wing with two streaks sometimes united in area 1b and a spot beyond, cell with a basal streak and an outwardly indented spot, a large oval spot at base of area

Tirumala limniace leopardus- Female (Upperside)

2, another small spot at base of area 3 with a smaller discal spot beyond it, five obliquely placed subapical streaks, the three latter very slender at costa, post discal and submarginal series of irregularly arranged spots and submarginal ones being smaller;. Hind wing in areas 1a, 1b with basal streaks, the latter with double streak in area 1b, cell having forked broad streak and its lower branch with a hook or spur like projection, at the base of areas 2 and 3 a slender loop, areas 4 and 5 with a broad elongate streak at their bases and a quadrate spot at base of area 6, an irregular series of postdiscal and submarginal spots, the latter being smaller. *Underside* having markings on wings as on upperside but with golden tinge; fore wing with apical third area olive brown and basal two-thirds dusky black; hind wing entirely olive brown and in area 1b with a pendulous light yellowish brown scent patch with a dark brown border. **Female**- as male, but no scent patch on underside of hind wing.

Tirumala limniace leopardus- Female (Underside)

Variation: Only this subspecies is found in India. The wing markings are usually bluish white and some of these may have a yellowish tinge.

Wing expanse: Male, female 90-100 mm.

Habits: The butterfly has usually slow flight but it can fly more powerfully than many danaines when disturbed or migrating. It is mainly an inhabitant of hedgerows and lightly woodlands. In male, the pouches and pockets of specialized scales are stroked by the abdominal brushes to scatter scent which acts as an aphrodiasic for the females.

Habitat and ecology: It is found throughout the plains and hills of India up to elvations of about 2000m in Himalaya. It is found everywhere except in desert regions and at high altitudes.

Life history: The larva is yellowish white or yellowish green, with a pair of long fleshy filaments on the third segment and a short pair on the 12th segment. The full grown larva is about 37 mm in length, 7 mm in breadth and length of anterior tentacles being 9.5 mm. Its body is black-brown above and banded with blue-white but the venter is white-green. The pupa is green at first, but after a day or two numerous shiny gold dots and a raised belt of the same colour appears. It is suspended by the tail, somewhat cylinderical, constricted below the thorax. It measures about 22.5 mm in length and 10.7 mm in breadth and height at segment 7.

Food-plants: *Calotropis gigantea* (Ak, Akhanda), *Dregea volubilis* (Nak-Chhikni, Titakunga), *Holorrhena antidysenterica* (Khurchi), *Hoya* sp., *Marsdenia tenacissima* (Chit, Jiti, Marua bel), *Tylophora indica* (Emetic Swallow-wort).

Distribution: India: Andaman & Nicobar Islands Assam, Orissa, Punjab, Sikkim, Uttarakhnd (Kumaon), West Bengal. Elsewhere: Bangladesh, China (Hainan), Indo-China, Myanmar, Pakistan, Malaya (Perak), South China, Sri Lanka, Taiwan , Thailand, Vietnam (Tonkin).

Status: Very common.

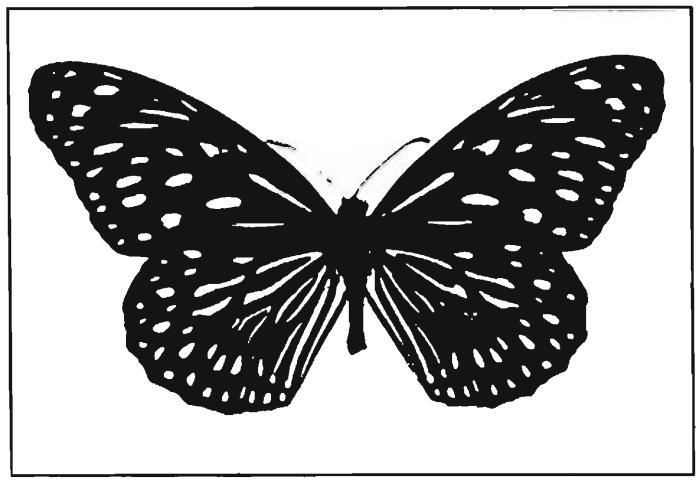
40. *Tirumala septentrionis* (Butler)

Danais septentrionis Butler, 1874.
Danais septentrionis Butler: Bingham, 1905.
Danais melissa septentrionis (Butler): Evans, 1932.
Danaus hamata septentrionis (Butler): Talbot, 1947.
Danais melissa (Cramer): Wynter-Blyth, 1957.
Tirumala septentrionis (Butler): Ackery & Vane-Wright, 1984; Varshney, 1993.

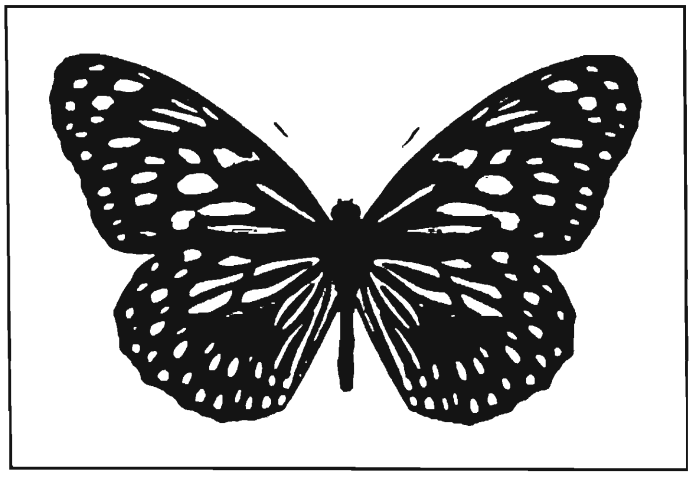
Common name: Dark Blue Tiger.

Diagnostic characters: Tailless. Upperside black or very dark brown, with narrower pale wing markings.

Morphological characters: **Male**- *Upperside* of wings with ground colour black with semihyaline markings large, irregular, narrower and darker and more blue tinted than in *T. limniace leopardus* (Butler); fore wing in area 1b having two narrow streaks, not united, upper one of these streaks forming an oval detached spot, above vein 5 short streaks acute and outwardly not truncate; hind wing with two cell streaks united at base and separated distally, the lower cell streak not forming any hook. *Underside* of wings usually darker than in *leopardus* and without any golden tinge, pendulous pouch in area 1 present. **Female** – like male but underside of hind wing without any pendulous pouch.



Tirumala septentrionis septentrionis- Male (Upperside) after D'Abrera, 1982



Tirumala septentrionis dravidarum- Male (Upperside) after D'Abrera, 1982

Variation: The species shows variation in colouration and extent of wing markings.

There are two subspecies found in India.

i) *T. septentrionis septentrionis* (Butler) -As given under morphological characters. Himachal Pradesh (Kulu), Himalaya. Elsewhere: Afghanistan, Bhutan, China, Hainan, Malaya, Myanmar, Sumatra, Taiwan (Formosa), Thailand (Siam), Tong- king, Yunnan.

ii) *T. septentrionis dravidarum* Fruhstorfer- Wings with paler markings and broader streaks, those in area 1b usually united in fore wing and post discal patches more extended in hind wing. Peninsular India.

Wing expanse: Male, female 80-105 mm.

Habits: This butterfly is slow flier and is a common migrant in South India. It visits moist places and is fond of flowers. It shows Batesian mimicry as *Paranticopsis megarus* (Spotted Zebra) of Papilionidae is mimic of this species.

Habitat and ecology: It is found throughout the year but is commonest at low elevations during the wet weather. It is found both in open as well as wooded areas. It flies to elevations of 2450m. In the Himalaya, butterflies of autumn and spring broods fly below 2450m.

Life history: The eggs are laid singly, each on a separate leaf; egg white, globular much flattened at the point of attachment to the leaf. The larva hatches after four days, white with black head. After another two days the first moult takes place, after which the larva shows black transverse lines and fleshy spines. A week later it ceases to feed, pupating shortly afterwards. The pupa is green, with shiny gloss, golden dots and a golden band at the base of the abdomen; scarcely distinguishable from the green of the food-plant. The pupal stage lasts eight days.

Food-plants: *Asclepias sp.; Dregea volubilis* (Nak Chhikni, Titakunga), *Vallaris solanacea.*

Distribution: India: widely distributed, Arunachal Pradesh (Mishmi hills), Assam, Himachal Pradesh, Himalayas, Nagaland, Peninsular India, Sikkim, Uttarakhand. Elsewhere: Afghanistan, Bhutan, China, Malaya, Myanmar, Nepal, Sri Lanka, Sumatra, Taiwan, Thailand, Vietnam (Tonkin).

Status : Very common in South India and fairly common in the Himalaya.

41. *Euploea core* (Cramer)

Papilio core Cramer, 1780.

Euploea core (Cramer): Bingham, 1905; Evans, 1932; Talbot, 1947; Wynter-Blyth, 1957; Ackrey & Vane-Wright, 1984; Varshney, 1993.

Common name: Common Indian Crow.

Diagnostic characters characters: Upperside of wings black, with rows of submarginal and marginal white spots on both wings and fore wing with a short brand in male.

Euploea core core- Male (Upperside)

Morphological characters characters: **Male-** *Upperside* of wings black or glossy brown; fore wing with a submarginal and a marginal row of white spots, anterior spots of both these series sometimes absent, submarginal spots in areas 4 and 5 usually smaller than the others, a short narrow brand in area 1b present. Hind wing with a submarginal row of white spots, the latter forming short stripes below vein 5. *Underside* of both wings usually with a few discal spots and a spot in apex of cell. **Female-** as in male but upperside of fore wing without brand in area 1b.

Morphological characters characters: Male- *Upperside* of wings black or glossy brown; fore wing with a submarginal and a marginal row of white spots, posteriorly towards inner margin spots larger than the anterior ones, this row of spots curved inwards and reaching costa well before apex, a marginal row of smaller white spots not reaching apex but posteriorly reaching inner margin, a short narrow brand in area 1b present. Hind wing with a submarginal row of white spots, the latter elongate below vein 5, followed by a marginal row of smaller white spots. *Underside* of both wings usually with a few discal spots and a spot in apex of cell. **Female-** as in male but *upperside* of fore wing without brand in area 1b. *Underside* of fore wing having a spot in the cell and a short whitish-streak in area1b.

Variation: This species shows variation in ground colour of wings, size, shape and presence or absence of white spots.

The following eight subspecies are found in India.

i) *E. core core* (Cramer) - upperside of wings broadly paler over the outer areas; fore wing with submarginal and marginal spots prominent, more or less equal, or decreasing in size towards apex, and no basal spot in area 3. Widely distributed in India, Himalaya.

   a) f. *vermiculata* Butler- upperside of fore wing with the spots increasing in size towards apex. Sikkim.

ii) *E. core godartii* Lucas- upperside of fore wing with a varying violaceous apical patch, submarginal spots small, always a discal spot in area 3, a prominent brand in area 1b; hind wing submarginal and marginal spots almost equal. Manipur. Annam, Southern Myanmar, Thailand, Vietnam (Tonkin). It has following four forms.

   a) f. *layardi* Druce - Upperside fore wing apical area without violaceous dusting over the apex.

   b) f. *dominans* Fruhstorfer- Upperside fore wing apical area chiefly white, forming patches.

   c) f. *recussa* Fruhstorfer- Upperside of fore wing with grayish white apical area.

   d) f. *defigurata* Fruhstorfer- Upperside and underside hind wing without antemarginal dots.

iii) *E. core andamanensis* Atkinson- upperside pale brown, fore wing with two smaller discal spots closely placed to postdiscal diamond shaped spots in areas 2 and 3. South Andaman Islands.

iv) *E. core bumila* Evans- Much darker than *andamanensis;* upperside fore wing with discal spots smaller, postdiscal and submarginal spots larger. Little Andaman Islands.

v) *E. core ferrari* Tytler- Like *bumila* but paler, upperside fore wing with postdiscal spots much smaller. South Andaman Islands (North Sentinel Island).

vi) *E. core scherzeri* C. Felder- Upperside dark brown and outwardly cinnamon, a small brand in area 1b in male. Underside with distinct discal spots but without postdiscal and submarginal spots. Car Nicobar.

vii) *E. core camorta* Moore- Very much like *scherzeri* but outer borders much paler, especially the female; a small brand in male. Central Nicobar Islands.

viii) *E. core simulatrix* Wood-Mason & de Niceville- Underside fore wing usually with apical spots, the latter appearing on upperside. Male without a brand. Female upperside with borders of both wings very much paler than in male. South Nicobar Islands.

Wing expanse: Male, female 85-95 mm.

Habits: The butterfly is slow flying. It may be seen sailing lazily along in all types of regions or flying about shrubs and bushes for its foodstuff. It migrates with other Danaines. It is a pest on vegetables. It shows Mullerian mimicry as it is mimicked by *Chilasa* and the female of *Hypolimnas bolina.*

Habitat and ecology: This is the commonest of the Crows, occurring throughout India below 2450m. It appears from time to time in the low, wet , jungle regions of southern India. It is abundant during the monsoon.

Life history: The egg is nearly cylindrical for two-thirds its height and anteriorly rather pointed and dome-shaped. It is about 1-4 mm in length and I mm in breadth. The colour at first is white, thereafter turning yellow, then orange and lastly becoming greyish. The larva is dark brown, sometimes nearly violet or with a tinge of claret, transversely banded with white; or bluish-white and banded with brown. It is about 47 mm in length, 6.5 mm in breadth, 6 mm in height and length of tentacles on segment 3 being 10 mm. The pupa is silvery-golden and marked with dirty light brownish. The pupal stage lasts 6-9 days, probably according to the humidity of the air.

Food-plants: *Anodendron paniculatum* (Lamtani), *Cryptolepis glandiflora* (Chawal chatti), *C. sinensis, Ficus benghalensis* (Banyan), *F. glomerata* (Counry fig, Goolar), *F. indica, F. religiosa,* (Pipul), *Hemidesmus indicus* (Indian Sarsaparilla), *Holarrhena antidysenterica* (Kura, Kurchi, Dudhi), *Holigarna arnottiana, Ichnocarpus frutescens* (Kali Dudhi), *Nerium oleander* (Oleander), *Nerium* sp., *Streblus asper* (Siamese Rough Bush).

Distribution: India: Assam, Northern and Peninsular India, Punjab, West Bengal. Elsewhere: Bangladesh, Indo-China, Indonesia (Java, Sumatra), Sri Lanka.

Status: Very common.

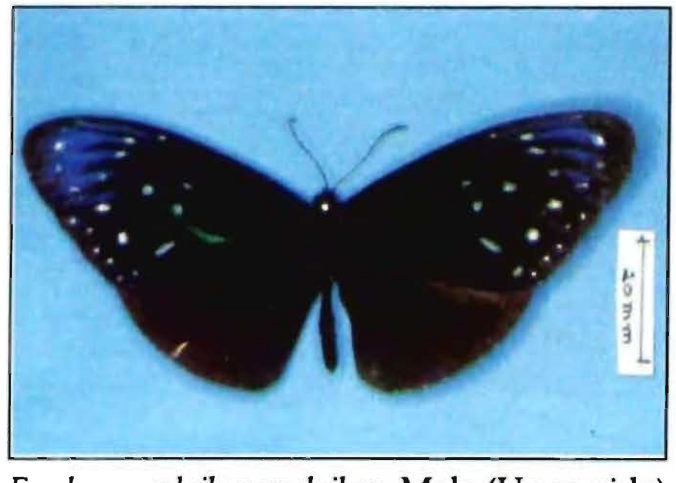
42. *Euploea mulciber* (Cramer)

Papilio mulciber Cramer, 1777.

Euploea mulciber (Cramer): Bingham, 1905; Talbot; 1947; Wynter Blyth, 1957; Ackrey & Vane-Wright, 1984; Varshney, 1993.

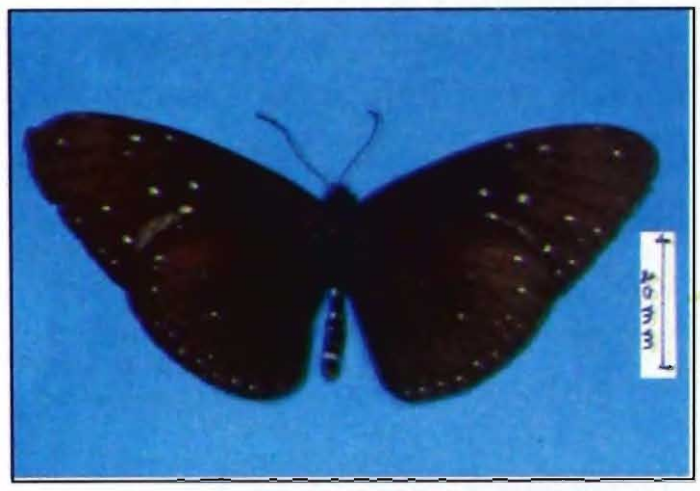
Common name: Striped Blue Crow.

Diagnostic characters: Upperside of wings dark brown, fore wing glossed blue and with white or violet-white spots, hind wing unmarked in male but with white streaks in female.



Euploea mulciber mulciber- Male (Upperside)

Morphological characters: **Male**- *Upperside* of wings dark brown; fore wing glossed with brilliant blue and bearing white and violet-white spots, a spot in apex of cell in, an elongated spot a much curved series of five-six postdiscal spots and its costal spot smallest, a sinuous series of submarginal spots and a marginal series of spots incomplete apically, an elongate violet-white spot at vein 2 between postdiscal and submarginal spots. Hind wing unspotted, apical half overlaid with greyish scales, a small yellow patch of specialized scales present in cell. *Underside* brown and spots distinct, fore wing with both submarginal and marginal series of spots incomplete apically, Hind wing with discal spots in areas 3 and 5, submarginal series of spots incomplete below vein 4 and marginal series of spots incomplete above vein 5. **Female**- *Upperside* ligher brown; fore wing with blue shot area smaller, spots as in male but



Euploea mulciber mulciber- Male (Underside)

white and larger, an elongate discal spot below costa; hind wing with narrow white streaks in the cell and in areas beyond cell, a submarginal series of white spots, the latter irregularly arranged anteriorly. *Underside* mostly as on upperside, spots and streaks distinct on both wings; fore wing with a streak and a conical spot in the cell, the conical spot joined above it to a short, narrow and elongate spot, and another curved streak in area 1b.

Variation: The species exhibits variation in extent of blue gloss, size and shape of spots and streaks. There are following two subspecies found in India.

Euploea mulciber mulciber- Female (Upperside)

i) *E. mulciber mulciber* (Cramer)- Upperside of fore wing dark brown glossed with brilliant blue violescent white spots but lighter brown in female. Andaman & Nicobar Islands (Nicobar-Bompoka Island; Andaman Island), Assam (Mishmi Hills), Himachal Pradesh (Shimla), Nagaland, Uttarakhand (Kumaon, Mussoorie), Punjab (Fategarh). Elsewhere: China, Malaya, Myanmar (Chin Hills), Nepal, Tong-king.

ii) *E. mulciber kalinga* (Doherty) – Upperside of fore wing lesser blue, spots larger and whiter in male and underside of hind wing without streaks in the cell in female. Orissa (Ganjam), Eastern Ghats, Orissa, Rajasthan (Jaipur), Tamil Nadu. Vizagapatnam.

Wing expanse: Male, female 90-100 mm.

Euploea mulciber mulciber- Female (Underside)

Habits: This species flies about 1- 6m above the ground. It is very fond of flowers, where it sits with the wings closed. The females fly lower over bushes and scrubs. The males bask in sunshine and are attracted to dung, urine, salt sources, wet rocks and damp patches. It is mimicked sex for sex by *Elymnias malelas* (Palmfly) and *Chilasa paradoxa* (Great Blue Mime) of the subfamilies Satyrinae and Papilioninae, respectively. The individuals of winter (January) brood are smaller but those of summer (July) brood are larger.

Habitat and ecology: It is found on the plains and in the hills where it ascends 2500m.

Life history: The larva is cylindrical, with four pairs of long, fleshy subdoreal filaments which have pink bases and black tips. Its body is pinkish-white with lateral yellowish blotches. The pupa is short and thick across the middle; thorax concave behind; abdominal segmenta dorsally convex, metallic golden-brown with a darker brown anterior stripe.

Food-plants: *Argyreia sp., Ficus sp., Ichnocarpus sp., Nerium oleander* (Oleander, Rose Bay). Very fond of flowers.

Distribution: India: Andaman & Nicobar Islands, Assam, Himachal Pradesh, Meghalaya, Nagaland, Uttarakhand, Uttar Pradesh (Fategarh), Tamil Nadu, West Bengal. Elsewhere: China, Indonesia (Borneo, Java, Sumatra), Malaya, Myanmar, Taiwan, the Philippine Islands, Vietnam (Tonkin).

Status: Common in North-east India and rare elsewhere. This species is protected under Schedule IV of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

43. *Euploea radamanthus* (Fabricius)

Papilio radamanthus Fabricius, 1793.

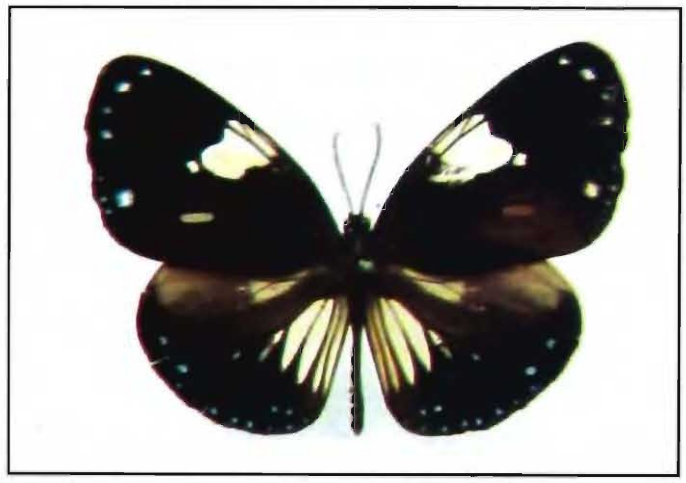
Euploea diocletiana (Fabricius): Bingham, 1905; Talbot; 1947; Wynter Blyth, 1957.

Euploea radamanthus (Fabricius): Ackrey & Vane-Wright, 1984; Varshney, 1993.

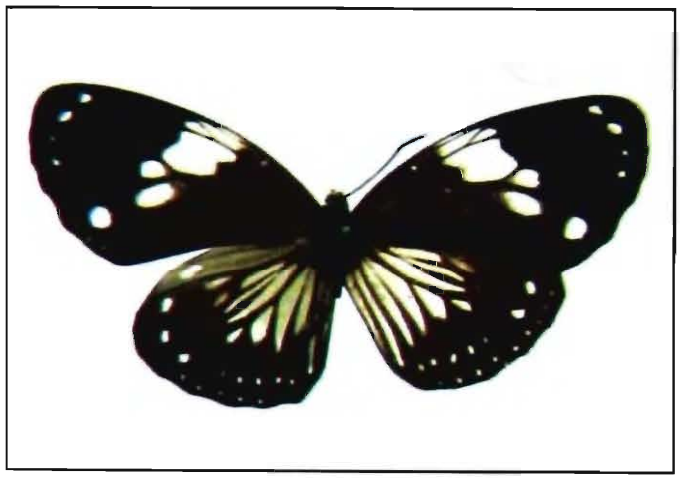
Common name: Magpie Crow.

Diagnostic characters: Upperside of wings brown and glossed blue; fore wing a very large white spot in distal area of cell and hind wing with white stripes below the cell. In female, wings less glossed blue and additional white stripes in the cell.

Morphological characters: **Male-** *Upperside* wings with a blue gloss, chiefly over the distal areas; fore wing with a very large white spot filling outer part of the cell and extending to the costa, this spot being divided the veins, below the larger spot being spot in area 2 larger than spot in area 3, a submarginal series of white or blue spots and the spot in area 2 much larger than the others, marginal small white spots faint and may be obsolete in the middle. Hind wing with the white stripes below the cell in areas 1a to 2, a spot may be present areas 3 and 4

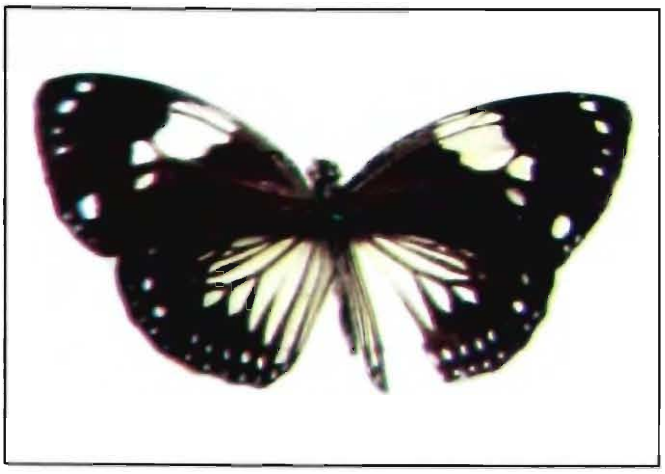


Euploea radamanthus radamanthus-Male (Upperside)



Euploea radamanthus radamanthus- Female (Upperside)

Female- *Upperside* ground colour black brown, only weakly glossed blue, markings mostly white and larger. Hind wing with additional white stripes in the cell and two or three post cellular spots and incomplete series of submarginal and marginal white spots. Anal hair-pencils grey.



Euploea radamanthus ramsayi- Female (Upperside)

Variation: The species shows variation in extent of blue gloss and size, presence and absence of spots.

The following three subspecies occur in India.

i) E. radamanthus radamanthus (Fabricius)-Upperside white markings restricted and in male, not entering the base of area 3. Assam. Indo-China, Malaya, Myanmar, Sumatra.

ii) *E. radamanthus ramsayi* (Moore) - Upperside white markings more extensive and in male, entering the base of area 3. Assam, Sikkim. Nepal.

iii) *E. radamanthus despoliata* Fruhstorfer - Upperside fore wing without a white patch in the cell. Assam (Cachar). North-western Myanmar.

Wing expanse: Male, female 80-90 mm.

Habits: The males of this butterfly visit flowers, moist and salt patches. The females are found usually at higher altitudes than the males which visit flowers and settle frequently on damp sand. The eversible caudal rosettes of the males are finely vanilla scented. It has magpie-like markings. This species is mimicked by *Chilasa paradoxa* (Great Blue Mime) of the family Papilionidae and two female forms of *Euripus nyctelius* Doubleday (Courtesan) of the family Nymphalidae. When flying its colouration makes it particularly difficult to see in the chequered light of the jungle.

Habitat and ecology: It is very common in North-east India in the sheltered, forested valleys of hilly regions between 300m and 1225m. It is abundant in the rainy season and the autumn.

Food-plants: *Ficus* sp., *Ichnocarpus* sp.

Distribution: India: Assam, Arunachal Pradesh, Sikkim. Elsewhere: Indo-China, Indonesia (Borneo, Java, Sumatra), Myanmar, Nepal.

Status: Common. This species is included in Schedule IV of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

44. *Euploea sylvester* (Fabricius)

Papilio sylvester Fabricius, 1793.

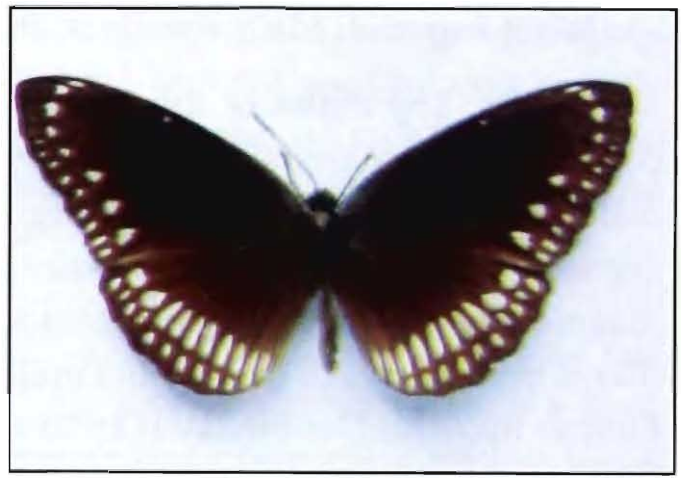
Euploea coreta (Godart): Bingham, 1905; Evans, 1932; Talbot, 1947; Wynter-Blyth, 1957.

Euploea sylvester (Fabricius): Ackrey & Vane-Wright, 1984; Varshney, 1993.

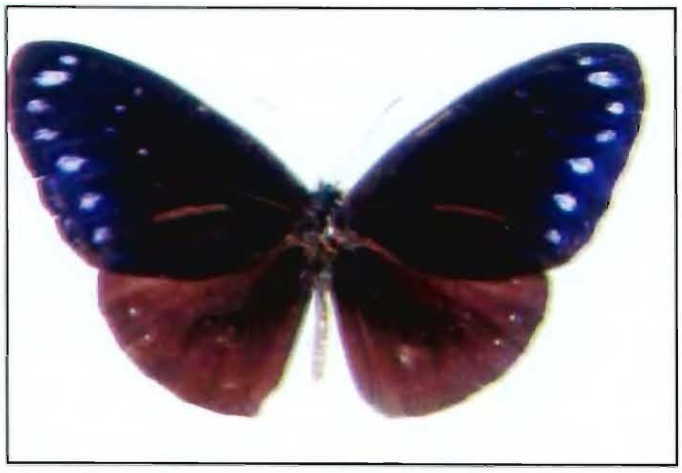
Common name: Double-Branded Black Crow.

Diagnostic characters: Upperside glossy brown with submarginal and marginal white spots. Male with two parallel and larger brands on upperside of fore wing.

Morphological characters : **Male-** *Upperside* glossy brown; fore wing with a submarginal series of white spots, anteriorly curved inwards opposite to the apex and spots small in areas 4, 5, at costa and at inner margin, a marginal series of white spots, the latter decreasing in size and becoming obsolete anteriorly at apex, two parallel and larger sex brands in area 1b.



Euploea sylvester coreta-Male (Upperside)



Euploea sylvester hopei- Male (Upperside)

Hind wing with a submarginal series of white spots and these spots forming short stripes below vein 4, followed by a row of marginal white spots. *Underside* of fore wing always with a basal spot in area 6 prominent than spots in areas 4 and 5 when present, a spot present in the cell. **Female-** male brands represented by faint markings on *upperside* and two white streaks in area1b on the *underside* of fore wing.

Variation: The species shows variation in the size and shape of spots and colouration of both wings.

It has following two subspecies occurring in India.

i) *E. sylvester coreta* (Godart) – Upperside of hind wing with a submarginal and a marginal series of yellowish white spots, the submarginal spots being elongate and paired in areas 1b to 3. Peninsular India.

ii) *E. sylvester hopei* (C. & R. Felder) – Upperside of hind wing having submarginal and marginal series of yellowish white spots reduced to two or three apical ones. *Underside* of both wings with the submarginal and marginal spots reduced to dots, the submarginal ones starting from below the apex and not reaching the tornus whereas the marginal ones starting at tornus and not reaching the apex. Assam, Sikkim. Myanmar (Southern Shan States).

Wing expanse: Male, female 85-95 mm.

Habits: The flight of the butterfly is rapid and sailing. It settles on damp patches, flowers and dry twigs. It shows Mullerian Mimicry as it is mimicked by the Mimes and Palmflies.

Habitat and ecology: It inhabits the plains and hills and ascending about 2000m in Southern India but not common in the hills along its west coast, and is not seen in the dry months. It appears in Assam (Cachar) during the month of June.

Life history: The egg is laid on the underside of a leaf. The larva first eats the egg-shell, then takes to the leaf, living always on the underside. It may be attacked by the hymenopterous parasites. The body of larva is smooth, with a greasy appearance and ordinarily a light violet-green above with chocolate-green on the venter. The full grown larva measures about 39 mm in length, 6 mm in breadth and length of tentacles varies from 6-14mm. The whole surface of pupa is shiny and smooth, silvery with pale brown markings. Its length is 18.5 mm and breadth at segment 7 being 8.5 mm.

Food-plants: *Ficus glomerata* (Counry fig, Goolar), *Ichnocarpus frutescens* Kalidudhi.

Distribution: India: Assam, Nagaland, Peninsular India, Sikkim, West Bengal. Elsewhere: Bangladesh, Malaya, Myanmar, Sri Lanka, Thailand, Vietnam (Annam).

Status: Locally very common. Generally not rare.

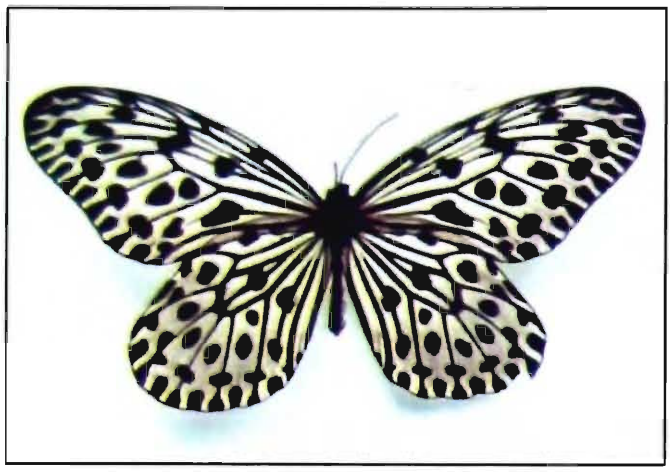
45. *Idea malabarica* (Moore)

Hestia malabarica Moore, 1877.
Hestia malabarica Moore: Bingham, 1905.
Hestia lynceus malabarica Moore: Evans, 1932.
Idea malabarica (Moore): Talbot; 1947; Ackrey & Vane-Wright, 1984; Varshney, 1993.
Hestia lynceus (Drury): Wynter Blyth, 1957.

Common name: Malabar Tree Nymph.

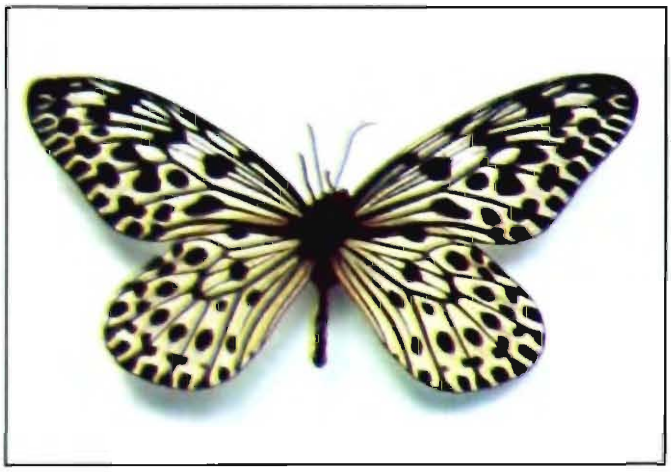
Diagnostic characters: Large. Upperside of wings semitransparent white, each of both wings with a black spot and 2-3 black streaks in the cell, outside cell with numerous black spots.

Morphological characters: **Male-** *Upperside* semitransparent white, slightly dusted with black scales, with black markings; fore wing with a dusky streak along the dorsum, large subbasal black spots in areas 1and 2, a large oval spot crossing three streaks in the cell, a spot in area 11 often joined with oval spot in cell, end cell broadly black, a discal series of



Idea malabarica malabarica-Female (Upperside)

outwardly conical spots curved sharply inwards opposite apex, a submarginal series of united spots on veins, a marginal series of elongate spots on veins and in areas, basal costal streak black and it white and black alternately. Hind wing with markings mostly as on fore wing, cell with two streaks and upper streak forked towards apex of cell, costa white, two spots not touching the vein below in interspace 8, spots in pairs on veins 5, 6 and 7 not united but one behind the other. *Underside* like that of upperside. **Female-** as in male but usually with more wing expanse.



Idea malabarica kanarensis- Male (Upperside)

Variation : The species varies in colouration, size and shape of black spots and streaks on wings.

The following two subspecies occur in India.

i) *I. malabarica malabarica* (Moore)- Larger and dull white. South India (Malabar, Travancore, Nilgiris, Mysore). 120-160 mm.

ii) *I. malabarica kanarensis* (Moore) – Smaller and whiter than *malabarica*. Peninsular India (North Kanara). 120-140 mm.

Wing expanse: Male, female 120-160 mm.

Habits: The butterfly has a sailing, floating and leisurely flight. It lives in small groups of three-four individuals. There is record of up to one hundred individuals together floating about the trees, about six metres above the ground.

Habitat and ecology: It is commonly found in damp forests at elevations of 300-1200m, often in the vicinity of the streams. It was recorded from the western slopes of the Nilgiris at elevations of 900-1200m.

Life history: The eggs are white and oval, marked with longitudinal rows of hexagonal indentations. They hatch in 6-7 in days. The egg-shell is eaten for the first meal. The newly hatched larva is transparent, pale yellow bearing four pairs of minute fleshy tentacles arranged as in more mature grub. The first skin is cast in a few days, and the larva then assumes the colours and markings which it retains until it changes to a pupa. It eats its cast skin in the first two stages only. The young larva has the peculiar habit of eating holes in the centre of the leaf instead of from the margin forwards, as with most caterpillars, but this habit it gives up as it increases in size. It conceals itself generally on the under surface of the leaf. The larva attains its full size in from 20 to 25 days. Full sized larva is about 50mm long. It is now about 50mm long, cylindrical, slightly tapering towards the extremities, and provided with four pairs of black fleshy tentacles, a pair on each of the 3rd, 4th, 6th and 12th segments. Its skin is smooth, glossy; head black; segment 2 white, with two small dorsal dots; all the other segments white, with a broad band of black round the centre of each ; segments 6, 7, 8, 9, 10, and 11 have on each side of the black ground small round patches of bright scariet, particularly distinct on segments 6 and 11; venter black; legs black. The pupa is gold yellow with large patches of bright metallic gold. The black spots on the wings of the butterfly showing through the yellow parts of the chrysalis. It is about 25mm long and 11mm broad. It is golden-yellow, with large patches of bright metallic gold. It is after 12-13 days, pupa becomes black and thereafter emerges the imago butterfly.

Food-plants: *Aganosma cymosa* (Apocynaceae).

Distribution: India: Peninsular India.

Status: Not rare.

SUBFAMILY SATYRINAE

They are usually medium sized, with wings short and broad, often with tremens scalloped or dentate or caudate on the hind wing.

The wings are usually dull brown and ornamented with submarginal eye spots. In many species the underside is cryptic. They are weak in flight and frequent shady situations

Eyes hairy in only a few genera. Palpi flattened laterally and usually densely hairy. Fore tarsi imperfect and brush-like in both sexes, nad useless for walking. Body slender. Fore wing with all veins present, and with the veins basally thickened (very slightly so in some genera) or, more usually, with one or more veins swollen at the base. On fore wing vein 10 arises from the cell (except *Ypthima* Huebner and *Ragadia* Westwood). Hind wing with a precostal vein. Cells of both wings closed by tubular veins, except that the hind wing cell is open in *Ragadia* Westwood.

Secondary sexual characters are normally present in males; these are very variable. In the monsoon areas certain genera, notably *Mycalesis* Huebner and *Melanitis* Facricius, occur in dry- and wet season forms, the former being characterized by the more angulate wings, the cryptic pattern of the underside, and the reduced submarginal ocelli.

46. *Aulocera saraswati* (Kollar)

Satyrus saraswati Kollar, 1844.
Aulocera saraswati (Kollar): Bingham, 1905; Evans, 1932; Talbot, 1947; Wynter Blyth, 1957; Varshney, !994.

Common name: Striated Satyr.

Diagnostic characters: Upperside of both wings black glossed green, bearing postdiscal/discal white-creamy, uniformly broad band, reaching dorsum on hind wing. Underside very pale and mostly with white striations.

Morphological characters: **Male-** *Upperside* of both wings black glossed with green; Fore wing with an oblique postdiscal white, tinged with creamy, uniformly broad maculated band from the subapical black spot to inner margin; subapical black spot surrounded inwardly by a post cellular white spot in area 5 and outwardly by

two white spots, marginal white spots between the veins but two white spots at tornus in area 1c. Hind wing with a discal band white creamy, slghtly narrowing posteriorly and reaching inner margin; veins crossing the band usually not blackened, marginal spots between the veins being white but at tornus two white spots in area 1c. *Underside* of both wings with basal half very pale ochreous bearing dark brown striae, postdiscal or discal white bands mostly as on upperside. Fore wing with the white centred subapical black spot bordered inwardly by three spots forming a short white band reaching costa and surrounded outwardly by a spot in area 5 and above it two united small white spots, the spot below costa being divided by the vein, the postdiscal band edged on inner side by a black sinuous line, a submarginal brown fascia outwardly crenulate and a marginal whitish diffused area followed by white spots along endings of veins and ochreous in the middle of each intervenal space. Hind wing having lower basal area tinged with green, both ground coloured postdiscal brown fascia and submarginal white fascia diffused, marginal white spots along veins but ochreous in the middle of each area. **Female-** like that of male but larger and paler, and underside markings less prominent.

Aulocera saraswati- Female (Upperside)

Aulocera saraswati- Female (Underside)

Variation: The species exhibits variation in the size and shape of white creamy spots forming complete or macular bands.

Wing expanse: Male, female 60-75 mm.

Habits: The butterfly is one brooded and appearing in July- Octber, August. Its flight is both graceful and fast. It is fond of sunshine and frequents grassy places. It also settles on thistle flowers but frequently on rocks and paths. This species got its nomenclature after the name of the Indian Goddess of learning/knowledge "Saraswati"

Habitat and ecology: This butterfly is found in open and grassy khudsides. It ascends 1000-3050m.

Life history: The egg is marked with 23 ribs (Doherty,1886 a), whereas egg of other *Aulocera* has from 26 to 28 ribs.

Food-plants: Grasses, thistles.

Distribution: India: Himalaya, Himachal Pradesh, Sikkim, Uttarakhand. Elsewhere: Pakistan.

Status: Common.

47. *Aulocera swaha* (Kollar)

Satyrus swaha Kollar, 1844.
Aulocera swaha (Kollar): Bingham, 1905; Evans, 1932; Talbot, 1947; Wynter Blyth, 1957; Varshney, 1994.

Common name: Common Satyr.

Diagnostic characters: Upperside black with a bronzy sheen, having postdiscal band varying from white to bright yellow, narrowing posteriorly on hind wing and not reaching dorsum but rarely in female. Underside dark brown and white striations less prominent.

Morphological characters: **Male-** *Upperside* of both wings black with bronzy sheen paler. Fore wing with a post cellular spot in area 5, an oblique postdiscal white, tinged with creamy, maculated band, interrupted by a large subapical black spot; the latter surrounded by four white spots, postdiscal spots outwardly conical in areas 2 and 3,

Aulocera swaha swaha- Female (Upperside)

marginal white spots between the veins but two white spots at tornus. Hind wing with a discal band white creamy, distinctly narrowing posteriorly and not reaching below vein lb except rarely in female; veins crossing the band usually not blackened, marginal spots between the veins being white but tornus with two white spots. *Underside* of both wings with postdiscal or discal white bands broader; fore wing with less numerous greyish striae, the subapical black as on upperside but bordered inwardly by three spots forming a short white band reaching costa, simlarly bordered outwardly by two white spots united at costa and separated the lower spot. Hind wing having lower basal area tinged with green, both ground coloured postdiscal fascia and submarginal white fascia diffused. **Female**- like that of male but larger and paler.

Aulocera swaha swaha- Female (Underside)

Variation: The species exhibits variation in the size and shape of white creamy spots forming comlete or macular bands.

There are two subspecies found in India.

i) *A. swaha swaha* (Kollar)- Upperside of fore wing having postdiscal band white and broad. Sikkim, Uttaranchal (Nainital). Pakistan (Chitral).

ii) *A. swaha garuna* Fruhstorfer- Upperside of fore wing having postdiscal band bright yellow. Himachal Pradesh (Kulu), Jammu & Kashmir (Kashmir).

Wing expanse: Male, female 60-70 mm.

Habits: This is a smaller butterfly having its flight powerful and graceful. It appears in mid August and it flies until October. It prefers sunny places in forests.

Habitat and ecology: It is found frequenting open and grassy hillsides at elevations of 1500-3050m.

Life history: The larva is brown, with a rough hairless skin and it feeds on different grasses.

Food-plants: Grasses.

Distribution: India: North-west Himalaya, Sikkim, Uttarakhand. Elsewhere: Pakistan.

Status: Common.

48. *Callerebia nirmala* (Moore)

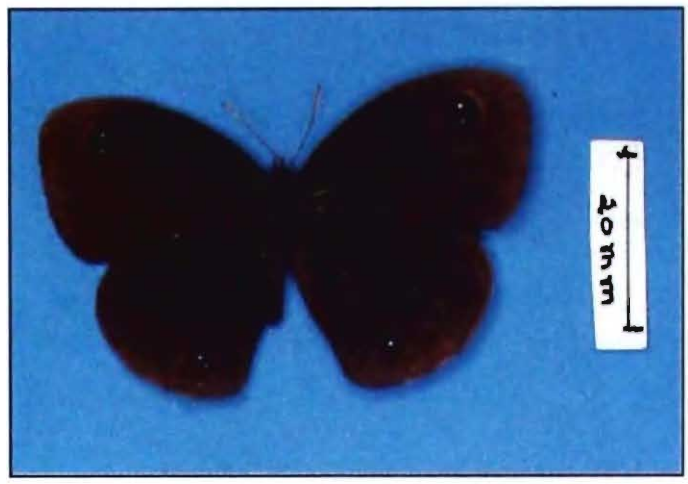
Erebia nirmala Moore, 1865.
Erebia nirmala Moore: Bingham,1905; Evans, 1932; Talbot, 1947.
Callerebia nirmala (Moore): Varshney, 1994.

Common name: Common Argus.

Diagnostic characters: Wings very rounded. Upperside dark brown. Fore wing with subapical white bipupilled black ocellus prominent and hind wing with similar single pupilled tornal ocellus.

Morphological characters: **Male-** *Upperside* mostly uniform dark brown; fore wing with a subapical black ocellus having two white pupils and a dark ferruginous ring, both subapical and marginal broad border pale. Hind wing with a subtornal single white pupilled black ocellust. *Underside* greyish brown; fore wing with discal portion maroon brown, ocellus large and yellow ringed, a white dot peresent below the ocellus. Hind wing with a postdiscal row of white dots; usually a small tornal ocellus and sometimes one or more ocelli developed in place of white dots. **Female-** like that of male but larger and paler.

Variation: This species exhibits variation in size and number of postdiscal ocelli on hind wing.

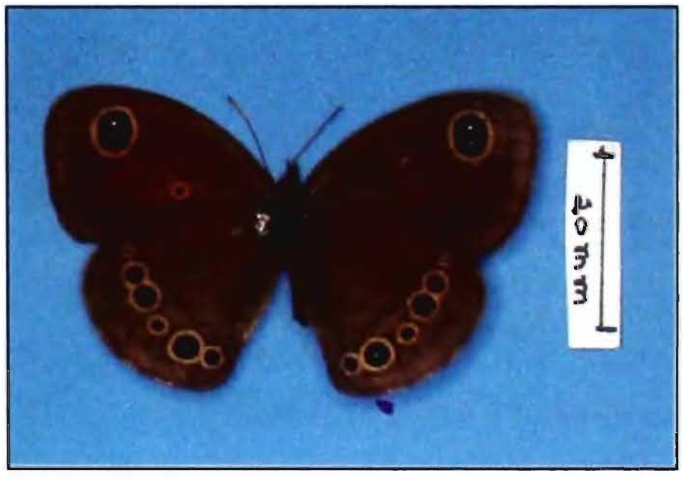


Callerebia nirmala nirmala-Female (Upperside)

The following two subspecies occur in India.

i) *C. nirmala nirmala* (Moore)- Underside of fore wing bright maroon; hind wing with white irrorations prominent and often broad discal line; number of ocelli varies from 1 or 2 to a complete row. Himachal Pradesh (Kangra), Uttarakhand (Kumaon).

ii) *C. nirmala daksha* (Moore) – Underside of fore wing dark brown; hind wing with a black ocellus in area 2, usually no ocellus in area 1 and rarely ocellus in area 4, discal line absent but white spots prominent. Jammu & Kashmir (Kashmir).



Callerebia nirmala nirmala-Female (Underside)

Wing expanse: Male, female 45-55 mm.

Habits: This species has a characristic flight which is slow and hopping. It prefers to fly in damp, shady or forest localities and also in both fine and misty weather.

Habitat and ecology: It very common at elevations of 1200-3050m, flying during May-July in the Shimla Hills and June-October further east.

Life history: When laid the egg is pearly white, about the size of very fine grain of *sago*, irregularly globular and slightly flattened at top and bottom. The larva emerged by eating away the top of the ahell, the 'reet of the ahell being left on toached. The newly- hatched larva is

a little over one-eighth of a inch long, white, with a few fine white hairs or down. Head black. After aix days the larvae were nearly one-fourth of a inch long, of a blue-green colour, fading to yellowish at the tail. After 11-15 days, the larva hatches which is white and a little over one-eighth of a inch long. When thirty days old, the full-grown larva is 30mm in length. The pupa is brown, the wing-cases paler and more of a reddish golden-brown, with a large dorsal protuberance and deep vertical incision before the abdominal segments.

Food-plants: Grasses- *Apluda, Eleusine, Oryza sativa* (Paddy, Rice), *Sorghum, Zea* spp.

Distribution: India: Himachal Pradesh, Jammu & Kashmir, Uttarakhand. Elsewhere: Pakistan.

Status: Very common.

49. *Elymnias peali* Wood-Mason

Elymnias peali Wood-Mason, 1883.
Elymnias peali Wood-Mason: Bingham, 1905; Talbot, 1947; Wynter-Blyth, 1957; Varshney, 1994.
Elymnias pealii Wood-Mason: Evans, 1932.

Common name: Peal's Palmfly.

Diagnostic characters: Upperside of wings black, outer margins dentate; fore wing with subapical band faint blue; hind wing with a submarginal blue band below vein 4, the latter tailed, a tornal red spot small in male but larger in female.Underside dark brownish.

Morphological characters: **Male-** *Upperside* black; fore wing costa with transverse flecks of pale blue, a subapical area and marginal area suffused with blue, apex produced and obtuse, outer margin dentate. Hind wing with apical area suffused faintly with pale blue, darkening posteriorly to a short submarginal band; an orange red spot at tornus, one hair pencil, outer margin crenulate and tailed at vein 4. *Underside* rich dark ferruginous brown; distal area striated

Elymnias peali- (Upperside)

diffusly with purplish lilac and below costa an elongated lilac brown patch. Hind wing with a subcostal prominent white spot; a tornal orange reddish spot diffused. **Female-** *Upperside* pale purple brown; fore wing blackish over area of cell. Hind wing much blackish over area of cell and posterior half of wing, tornal orange red spot quadrate and larger than in male and tail at vein 4 also longer than in male. *Underside* much paler than in male. Fore wing with the dark ferruginous colour restricted to the cell, rest of wing dull white, closely striated with purplish brown. Hind wing with the blackish area restricted to the disc posteriorly and to outer margin, rest of wing paler as on fore wing.

Variation: The upperside of hind wing tornus dull red in male but bright chestnut in female.

Elymnias peali- (Underside)

Wing expanse: Male, female 75-85 mm.

Habits: The specific habits are least known.

Habitat and ecology: This species appears during March-May and August-December.

Food-plants: Palms.

Distribution: India: Assam, Manipur, Nagaland. Elsewhere: Northern Myanmar.

Status: Endangered (Gupta and Mondal, 2005). This species is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

50. *Melanitis leda ismene* (Cramer)

Papilio ismene Cramer, 1775.
Melanitis ismene(Cramer): Bingham, 1905.
Melanitis leda ismene (Cramer): Evans, 1932; Talbot, 1947.
Melanitis leda (Linnaeus): Varshney, 1994.

Common name: Common Evening Brown.

Diagnostic characters: Upperside dark brown; wings broad; fore wing may be falcate withsubapical white pupilled black spots bordered with ochraceous; hind wing caudate.

Morphological characters: DSF- **Male-** *upperside* of fore wing with apex obtuse and falcate, outer margin below vein 5 straight or sinuous, produced and angled at vein 5. Upperside of wings rich brown; fore wing with large subapical black spots bordered above and inwardly by the ochraceous lunules. Hind wing without an ocellus in area 2, but posteriorly having three or four minute white submarginal spots. *Underside* highly variable, plain grey, or brown, or richly streaked, blotched or spotted with black, white or shades of brown, but never with fine brown streaks; ocelli absent, tail at vein 3 longer than at vein1. **Female-** like that of male but larger and paler; fore wing falcate apically.

Melanitis leda ismene- Male (Upperside)

Melanitis leda ismene- Male (Underside)

WSF- **Male-** *upperside* of wings dull dark brown; fore wing with apex subacute,

outer margin at apex slightly angulate or straight below vein 5. Fore wing with a large prominent black spot in area 3 and another smaller one in area 4, both these spots with white spots in the distal part, the inner edge of the black spots bordered narrowly with ochraceous and interrupted in area 4, costal margin narrowly pale. Hind wing with a submarginal black, white centred fulvous ringed ocellus in area 2, apical ocellus and other ocelli showing through below. *Underside* paler and densely striated with dark brown; fore wing with a curved discal narrow, dark brown band, a similar postdiscal band, a series of four submarginal ocelli and that in area 3 being the largest. Hind wing with a row of six ocelli, the apical and subtornal ocellus in area 2 being the larger; tails at veins 1 and 3 equal. **Female-** Mostly as male but larger and light coloured; fore wing prominently angled at vein 5.

Variation: The butterfly exhibits seasonal variation, and as such, wet season form and dry season form are distinctly recognized. The underside is marked with fine brown streaks in WSF but not in DSF. In female, the fore wing is produced prominently apically in WSF but falcate in DSF.

Only a single subspecies, *Melanitis leda ismene* (Cramer) occurs in India.

Wing expanse: Male, female 60-80 mm.

Habits: The butterfly is crepuscular, having weak jerky flight. It is fond of ripe fruit and toddy. During day time it takes shelter in under-growth or among bushes or the roots of trees or even in residential areas to avoid predators. When in danger, it flies over only a short distance and then settling on the ground and in the manner of displaying underside markings for protection. In the monsoon months it flies over the rice-fields in the morning and evening, most probably in quest of a mate.

Habitat and ecology:. This butterfly is widely distributed and is found nearly everywhere except desert, up to elevations of 2150m in the hills, flying almost throughout the year at lower elevations.

Life history: The butterfly lays its egg on the underside of a blade of grass or rice, either singly or in a row of two to seven. The larva lives constantly on the underside, closely applied to the surface. The body of larva is spindle-shaped, though approaching cylindrical. It is bright yellowish grass-green with a dark green line and an indistinct lateral yellow line. The larva measures 39 mm in length, 6 mm in breadth and horns 2mm in length. The pupa keeps suspended by the tail from underside of a leaf, twig, etc., hanging free but firm. The pupa is of a uniform watery grass-green. It is 21 mm in length, 7.75 mm in breadth at segment 8, 7 mm at shoulders, 3 mm at front of head and 7.2 mm in height at thorax-apex.

Food-plants: *Apluda, Eleusine, Ficus reliogiosa* (Peepul), Grasses, *Oryza sativa* (Paddy, Rice), *Panicum maximum* (Guinea Grass), *Sorghum vulgare* (Charri, Sorghum), *Zea* spp.

Distribution: India: Andaman & Nicobar Islands, Punjab, widely distributed except the desert i.e., the extreme of North-west India. Elsewhere: Indonesia (Borneo, Java, Sumatra), Malaya, Myanmar, Sri Lanka, Taiwan.

Status: Very common.

51. *Mycalesis evansii* Tytler, 1914

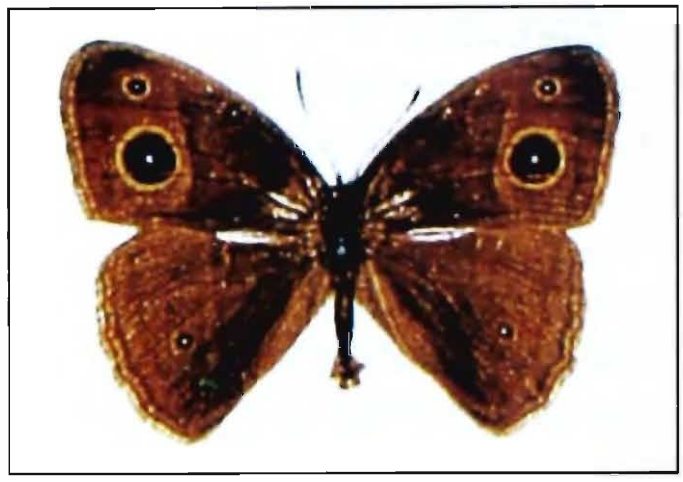
Mycalesis evansii Tytler, 1914.
Mycalesis evansii Tytler: Talbot, 1947.

Common name: Tytler's Bushbrown.

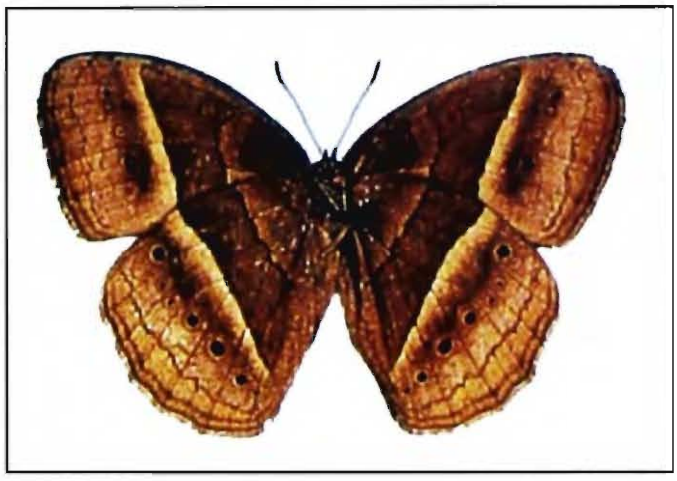
Diagnostic characters: Upperside brown. Fore wing with a large yellow ringed ocellus in area 2, hind wing with brand present but no ocelli. Underside with a yellowish-white discal band on both wings and underside of hind wing with 5-7 small postdiscal ocelli.

Morphological characters: **Male-** *Upperside* dull brown; fore wing with a fulvous ringed ocellus in area 2, usually a smaller ocellus in area 5, a short pale discal line, a submarginal and a marginal thin pale line more or less distinct. Hind wing with brand blackish brown,

hair pencil small and pale ochraceous, pale submarginal and marginal lines distinct. *Underside* pale brown; both wings with subbasal thin and blackish discal lines, the latter crossing the extreme base of area 2, a heavy yellowish white discal band with its inner edge well defined by dark brown but outer edge diffused, ocelli as on upperside and each with an ochreous ring and an outer greyish ring, submarginal and marginal pale lines prominent. Hind wing with five to seven small ocelli, the greyish white line enclosing the ocelli indistinct proximally but broad and prominent distally, submarginal and marginal lines as on upperside. **Female-** *Upperside* paler, fore wing ocellus in area 2 much larger, a short pale discal line more distinct. *Underside* more paler, both wings with subbasal thin and blackish discal lines distinct, a light yellowish white discal band.

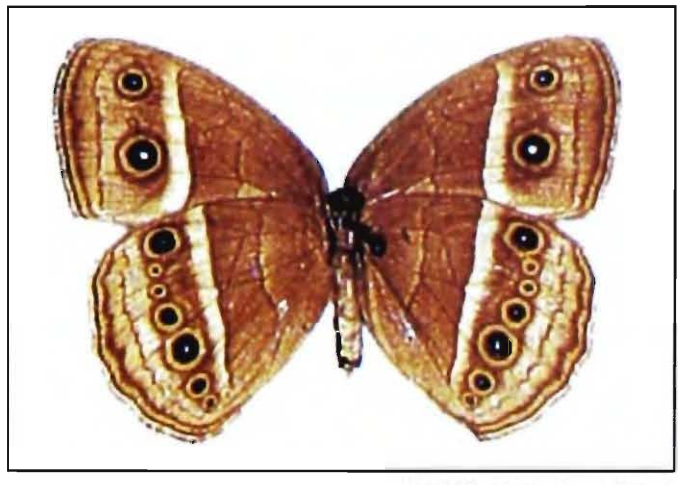


Mycalasis evansii- Male (Upperside) after D'Abrera, 1985



Mycalasis evansii- Female DSF (Underside) after D'Abrera, 1985

Variation: The specie shows variation in the colouration of wings, size of ocelli and extent of bands and lines on wings. The



Mycalasis evansii- Female WSF (Underside) after D'Abrera, 1985

species has wet and dry season forms. In DSF, all the ocelli are much smaller, and in female the subapical ocellus is usually present on the upperside

Wing expanse: Male, female 45-50 mm.

Habits: The butterfly ususally flutters close to the ground in jungle undergrowth.

Habitat and ecology: It appears as DSF in April and WSF during June-October.

Food-plants: Grasses.

Distribution: India: Assam, Manipur.

Status: Locally common.

52. *Rhaphicera satricus* (Doubleday)

Lasiommata satricus Doubleday, 1849.
Rhaphicera satricus (Doubleday): Bingham, 1905; Talbot, 1947; Varshney, 1994.
Pararge satricus (Doubleday): Evans, 1932; Wynter-Blyth, 1957.

Common name: Large Tawny Wall.

Diagnostic characters: Upperside dark orange yellow, wings with postdiscal black oblique bands or lines, spots in areas 2 and 5 in fore wing and submarginal spots in hind wing and these spots forming white centred ocelli on underside.

Morphological characters: **Male-** *Upperside* dark orange yellow. Fore wing with inner margin and vein 2 bordered with black, two black bands crossing the cell, the outer one broader, a postdiscal broader band from costa to vein 2 strongly angled outwards at vein 5, a black quadrate spot each in area 2 and 5, costa dusky, from apex and outer margin to vein 3 broadly black and continued narrowly to tornus. Hind wing inner margin broadly blackish, an oblique short bar from apex of cell towards apex of wing, a curved series of postdiscal four large spots in areas 2, 3, 5 and 6, followed by the submarginal and marginal slender

Rhaphicera satricus satricus- Male (Upperside)

black lines. *Underside* much paler with markings mostly like those on upperside. Fore wing with incomplete submarginal and complete marginal black lines, without black dorsum and outer margin, quadrate black spots of upperside forming white centred black ocelli in areas 2 and 5. Hind wing without oblique black bar, a slender postdiscal line from costa to vein 2 angled strongly outwards at vein 5, curved series of black spots of upperside forming white centred ocelli, a whitish bar beyond cell to the ocelli present. **Female-** Like that of male but larger, lighter in colouration and hind wing upperside with inner margin broadly paler.

Variation: The species shows variation in colouration, size of black bands and spots.

The following two subspecies are found in India.

i) *R. satricus satricus* (Doubleday)- Mostly agrees with the characters of the species given above. Sikkim,Uttarakhand (Kumaon), West Bengal. Bhutan.

Rhaphicera satricus satricus-Male (Underside)

ii) *R. satricus kabrua* (Doubleday) – Male having upperside deeper orange yellow, fore wing with marginal black extended below vein 3 at tornus and along inner margin, ocellus in area 3 usually merged with the black border; underside fore wing with dark markings slightly more extended and submarginal black line heavily marked between veins3 and 4, hind wing darker with the pale longitudinal bar prominent; and the female usually more

darker but lighter females also known. Manipur (Kabrua), Nagaland. China (Omei- Shan).

Wing expanse: Male, female 60-65 mm.

Habits: It flies rapidly and erratically. It is fond of settling on wet and dirty places and also on shady and damp rocks. It flies quite as freely in cloudy and rainy weather as on sunny days.

Habitat and ecology: It flies in the hills above 2500-3500m during August-September.

Food-plants: *Anaphalis* sp. (Flowers).

Distribution: India: Manipur, Nagaland. Sikkim, Uttarakhand, West Bengal. Elsewhere: Bhutan, China (Omei-Shan).

Status: Male not rare; female rare.

53. *Ypthima baldus* (Fabricius)

Papilio baldus Fabricius, 1775.

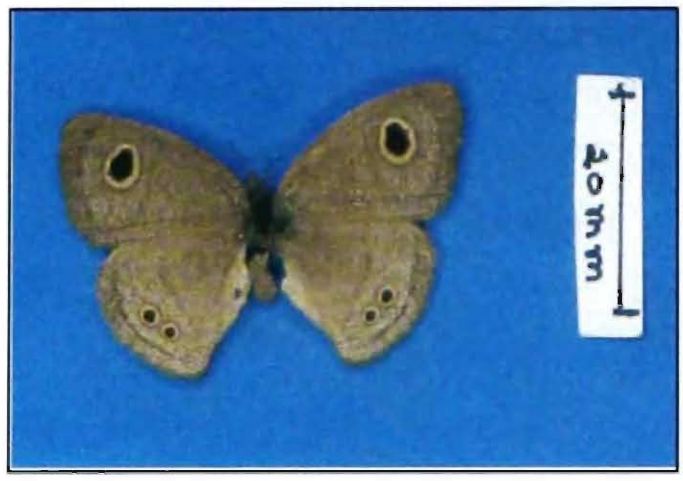
Ypthima baldus (Fabricius): Bingham, 1905; Evans, 1932; Talbot, 1947; Wynter Blyth, 1957; Varshney, 1994.

Common name: Common Five Ring.

Diagnostic characters: Upperside brown; male fore wing with brand and subapical ocellus; hind wing with discal band prominent. Underside with striations coarse, three pairs of ocelli in echeleon and bands distinct.

Morphological characters: **Male-** *Upperside* brown; fore wing with a subapical oval ocellus, brand on both sides the median vein. Hind wing with discal band and two to six ocelli. *Underside* paler with brown striations coarse, subbasal, discal and submarginal bands distinct; fore wing with a bipupilled ocellus. Hind wing with six ocelli placed in pairs in echeleon- two tornal, two median and two subapical. **Female-** *upperside* of both wings with the area surrounding the ocelli paler, closely striated with brown, discal band usually distinct, usually one of the apical and median pair of ocelli more

distinct. *Underside* paler than in male, subbasal, discal and submarginal bands well defined.

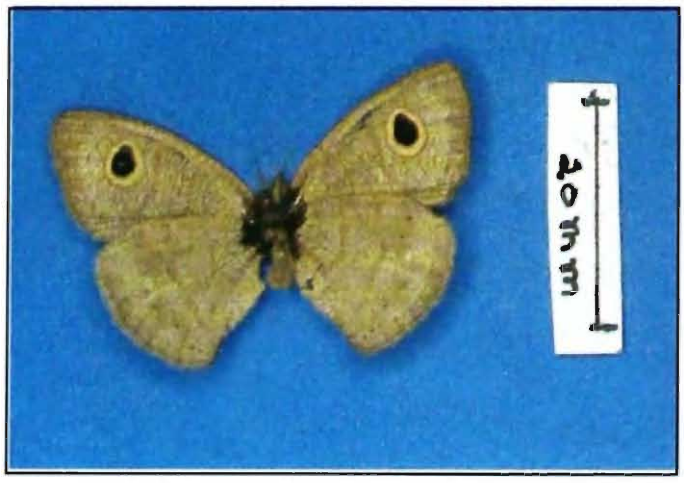


Ypthima baldus madrasa- Female (Upperside)

Variation: The species exhibits variation in the size and number of ocelli, and various bands which may or may not be distinct. It has also seasonal variations.

The following three subspecies occur in India..

i) *Y. baldus baldus* (Fabricius)– Underside in WSF with ocelli often large and confluent, discal bands less prominent than in *madrasa*. In DSF, paler; female ochraceous white, closely striated brown, hind wing ocelli usually without pupils; *underside* with bands prominent and hind wing ocelli reduced to specks. North- west Himalaya (Chamba), Assam. (35-48mm).



Ypthima baldus madrasa- Female (Underside)

ii) *Ypthima baldus madrasa* Evans – Underside of hind wing with ocelli usually well separated. In WSF, discal bands usually prominent on a pale ground. South India. (36-43mm).

iii) *Ypthima baldus satpura* Evans -Underside hind wing with apical and median pairs of ocelli usually confluent. Ground colour pale, and bands more obscure. Madhya Pradesh (Pachmarhi). (32-36mm).

Wing expanse: Male, female 32-48mm.

Habits: It usually flies in the clearings in the under-growths. Its flight is typical with slowly closing and opening of wings. It visits

flowers of various low growing plants.

Habitat and ecology: It is found both in open country and forest areas. It is extremely common in S. India from plains to elevations of 2150m, throughout the year but appears at different places according to seasons, as during March-May (Meghalaya), April-October (Cachar), May-July (Lower Bengal and East Bengal), July (Western Himalaya) and July-December (Sikkim).

Life history: The larva lives on rice; it is of reddish ochre-yellow colouring with indistinct dark stripes. The pupa is either dark ochre-yellow or brown or pale grey and spotted with brown.

Food-plants: Grasses.

Distribution: India: Assam, Himachal Pradesh, Madhya Pradesh, Maharashtra, Meghalaya, Nagaland, Punjab, Sikkim, South India, Uttarakhand, West Bengal, Western India, widely distributed in India. Elsewhere: Myanmar.

Status: Very common.

54. *Zophoessa goalpara* Moore

Zophoessa goalpara Moore,1865.
Lethe goalpara (Moore): Bingham,1905; Evans, 1932; Talbot, 1947; Wynter Blyth, 1957; D'Abrera, 1986.
Zophoessa goalpara Moore: Varshney,1994.

Common name: Large Goldenfork.

Diagnostic characters: Upperside brown. Fore wing with faint postdiscal band and a submarginal line, hind wing with a curved series of black spots close to submarginal band, tailed at vein 4. Undeside hind wing with a brown inverted Y-shaped marking.

Morphological characters: **Male**- *Upperside* of wings olive brown; fore wing with two faint dark bown bars in the cell and a similar, irregular postdiscal band crossing over the endof cell from costa to inner margin and a darker submarginal band, a broad brand from

the middle of vein 1b to base of vein 4 present. Hind wing with a curved series of black sopts between the black sinuous postdiscal and submarginal bands, marginal band of ground colour having on it middle a very narrow black line, tail at vein 4 present. *Underside* pale ochraceous; fore wing with two short dark brown bands dark in the cell and another at end of cell, postdiscal and submarginal bands dark brown, the postdiscal band having inner edge diffused and outer edge crenulate, marginal ground coloured broader area with a narrow dark brown line near the outer margin. Hind wing with a basal half paler and outer half darker, a subbasal, irregular and obsure dark band, an inverted Y-shaped dark band from costa to lower edge of cell near to and at its end, an irregular dark brown postdiscal band in continuation on fore wing, a series of ocelli cosely placed to the dark brown submarginal line, followed by a pale lunulate marginal line bordered with brown.**Female-** *upperside* dark olive brown, pale greyish brown exteriorly; fore wing with a marginal suffused brown line. Hind wing with a submarginal series of brown pale bordered spots, a marginal narrow lunulate pale line bordered with brown. *Underside* glossy greyish olive-brown, palest exteriorly, markings as in male, but more suffused. Fore wing with three small indistinct subapical ocelli.Hind wing with each marking with a paler border and submarginal ocelli less defined.

Zophoessa goalpara goalpara- Male (Upperside)

Zophoessa goalpara goalpara- Male (Underside)

Variation: The species displays variation in colouration, size of ocelli and other markings on wings.

There are three subspecies occurring in India.

i) *Z. goalpara goalpara* Moore - As morphological characters. Himachal Pradesh (Kulu, Shimla- Narkunda).

ii) *Z. goalpara gana* Talbot -Male- *Upperside* of fore wing with post discal line less distinct, more irregular below vein 4, and sharpely angled inwards in area 1b. Hind wing with larger spots. *Underside* with pale ochraceous markings; fore wing with post discal band irregularly toothed, its brown inner border narrower. Hind wing as in the nominate subspecies, except for the paler proximal area. Sikkim.

iii) *Z. goalpara kabruensis* Tytler – Male- *Upperside* of fore wing with post discal band less defined, or obsolete. Hind wing with postdiscal line thinner, and indistinct below vein 3. *Underside* resembles the Sikkim form, but the ground colour is darker ochraceous. Arunachal Pradesh (Mishmi Hills), Manipur, Nagaland.

Wing expanse: Male, female 65-80 mm.

Habits: This species is uncommon and inhabits forested regions.

Habitat and ecology: The butterfly is found during July-November at elevations of 1800-3050m.

Food-plants: Bamboos and Grasses.

Distribution: India: Arunachal Pradesh (Mishmi Hills), Assam, Himachal Pradesh, Manipur, Nagaland, Sikkim, West Bengal.

Status: Not rare from Sikkim to Assam, rare in Shimla hills. The nominate subspecies is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

55. *Zophoessa moelleri moelleri* Elwes, 1887

Zophoessa moelleri Elwes, 1887.

Lethe moelleri (Elwes): Bingham, 1905; Evans, 1932; Wynter Blyth,1957; D'Abrera, 1986.

Lethe moelleri moelleri (Elwes): Talbot, 1947.

Zophoessa moelleri Elwes: Varshney: 1994.

Common name: Moeller's Silverfork.

Diagnostic characters: Upperside brownish-yellow, fore wing with a diffused yellowish white discal band and beyond it 2-3 white spots below the costa, hind wing a curved series of postdiscal black spots on bright ochraceous band and a tail at vein 4 present.

Zophoessa moelleri moelleri- Female (Upperside)

Morphological characters: **Male**- *Upperside* of wings brownish-yellow; fore wing with basal area darker and subbasal light brown broad band, end cell darker, an yellowish white irregular discal band inlined with the more angularly sinuous dusky black band, the latter with diffused extentions along veins 2, 3 and 4, two-three white postdiscal white spots below the costa, followed by slightly darker submarginal and marginal bands enclosing between them a diffused light yellow line.Hind wing with basal half darker, a postdiscal curved series of black spots on bright ochraceous band, the latter bordered with dark brown on both sides, an obscure submarginal ochraceous line, a short at vein 4 presen. *Underside* of fore wing light brownish-yellow with white and brown bands prominent. Hind wing with anterior half of proximal area crossed by two oblique broad white bands bordered with dark brown inwardly (the outer band outwardly also) with dark brown; the apical four ocelli bordered outwardly with white. **Female**- as Male, but paler.

Zophoessa moelleri moelleri- Female (Underside)

Variation: Only the nominate subspecies, *Zophoessa moelleri moelleri* (Elwes) occurs in India. It shows variation in size of ocelli, white or yellowish white spots or bands.

Wing expanse: Male, female 50-55 mm.

Habits: It is found in open places in woods during July-August, rapidly circling round even in dull and rainy weather and assembling in small groups at any filth to attract them.

Habitat and ecology: The butterfly is found at elevations of 1500-3350m.

Food-plants: Bamboo and Grasses.

Distribution: India: Sikkim.

Status: Male not rare but female rare. The nominate subspecies is provided protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY MORPHINAE

They are very large and showy species. Majority of the species have enormous size of wings as compared to that of the body. Out of three tribes in World only Tribe Amathusiini occurs in India. Eyes smooth; labial palpi usually long, prominent and laterally compressed; termen of wings usually entire, underside of hind wing usually with submarginal ocellus in each of areas 2 and 6; fore legs imperfect in both the sexes.

56. *Stichophthalma camadeva* (Westwood)

Morpho camadeva Westwood, 1848.
Stichophthalma camadeva (Westwood): Bingham, 1905; Talbot, 1947; Wynter-Blyth,1957; Varshney, 1994.
Sticophthalma camadeva (Westwood): Evans, 1932.

Common name: Northern Junglequeen.

Diagnostic characters: Wings broader. Upperside of fore wing outer half bluish white having clove-shaped submarginal black spots, hind wing black with paired bluish-white submarginal spots. Underside ochraceous bearing ocelli and and prominent black lines.

Stichophthalma camadeva camadeva -Male (Upperside)

Morphological characters:

A very large, fine, broad winged butterfly. **Male-** *Upperside* fore wing with basal area dark chestnut brown, a black and thin lunule at apical half of end of cell, a white discal fascia broader at costa and narrowed to vein 1a and interrupted by bluish along veins 1b and 2, white discal fascia inlined and outlined by more bluish, the latter followed by a whitish area, postdiscal rounded black spots in areas 2, 4 and 6, a subamrginal row of black clove shaped spots with their narrow parts joining a broad black marginal band, anteriorly continued along one fourth of costa, the marginal band bearing diffused bluish white lunules and the outer white margin crenulate. Hind wing blackish blue, bluish white along dorsum, postdiscal paired bluish white spots forming maculated band with its inner edge strongly dentate, followed by a broad lunulate black band edged outwardly by bluish white lunules and narrow black lunulate line and lastly the outer margin white, the latter often coalescing with bluish white lunules apically and at tornus, a brand present above origin of vein 7 and a tuft from base of cell. *Underside* ochraceous with black markings prominent. Fore wing having basal part light

Stichophthalma camadeva camadeva -Male (Underside)

brown marked in its middle with a short black thin lunule in posterior half, a black lunule at end of cell, discal broader fascia olive brown inlined and outlined by irregular black lines, postdiscal yellowish-white fascia diffused followed by irregular brown band beyond which area being uniformly ochraceous, bearing a series of partly ocelli and partly obscure spots, two submarginal lunulate brown lines and ground coloured outer margin inlined by a black slender line, a brand in area 1b near base present. Hind wing with markings like those in fore wing except absence of a black lunule in basal area and presence of a black tornal spot and well formed ocelli, those in areas 2 and 6 being larger. Fore wing with. **Female-** almost as in male but lighter and larger and without brands on upperside of hind wing and underside of fore wing.

Variation: The species exihibits variation in size and number of black spots and extent of shading of colouration. Besides, it has seasonal forms. Four subspecies in India.

i) *S. camadeva camadeva* (Westwood) – Mostly agree with the morphological characters. Upperside milky white; hind wing with pale marginal area narrow. Sikkim. Not rare.

ii) *S. camadeva nicevellei* Roeber- Upperside milky white areas suffused with violet on proximal part in fore wing, submarginal band and marginal line in hind wing. Assam, Meghalaya (Khasi Hills). Not rare.

iii) *S. camadeva aborica* Tytler- Upperside resembling *nicevellei;* hind wing with postdiscal band very small and spots narrow. Underside resembling *nicevellei* but ground colour warmer brown. Arunachal Pradesh (Abor Hills).

iv) *S. camadeva nagaensis* Rothschild- Upperside paler; fore wing with golden yellow costa and very small chevrons. Below transverse lines straighter. Underside uniformly rufous with transverse lines and bands much straighter, less zigzag and less crenulate; Nagaland.

Wing expanse: Male, female 125-150 mm.

Habits: This species got its nomenclature after the name of the Indian God "Kamadeva" It inhabits very dense forests It flies close to the ground. It has two broods and individuals of DSF are paler.

Habitat and ecology: It is not rare at low elevations and ascends 600-900m. It appears during May-September.

Food-plants: Bamboos.

Distribution: India: Assam, Arunachal Pradesh (Abor Hills), Manipur, Meghalaya, Nagaland, Sikkim, West Bengal. Elsewhere: Bangladesh.

Status: Not rare.

57. *Thaumantis diores diores* Doubleday, 1846

Thaumantis diores Doubleday, 1846.
Thaumantis diores diores Doubleday: Talbot, 1947.

Common name: Jungle Glory.

Diagnostic characters: Upperside dark brown. Both wings with a prominent discal, metallic blue band; male with a small hair pencil but without a brand.

Morphological characters: **Male-** *Upperside* blackish brown. Fore wing with a discal large irridescent blue patch from below vein 8 to inner margin, the patch extending posteriorly towards base having its outer edge suffused with brilliant silvery gloss, beyond this patch following a small pale blue costal spot. Hind wing with a discal rounded irridescent blue patch, as in fore wing, from areas 3 to 5, a small hair pencil present near the base of the subcostal vein but without a brand. *Underside* very dark chestnut-brown; the basal five-sixths of both wings blackening outwards, a well-defined submarginal pale brownish-yellow sinuous line separating the marginal borders, the latter broadly dusted with grey-white. Fore wing with two pairs of sinuous black narrow bands across the cell, a similar postdiscal band running from costa to vein 1b. Hind wing with two similar bands as in fore wing but diverging posteriorly, a postdiscal yellowish-white oval spot with a black line in middle of its outer edge in area 6 and another yellowish-white spot with a large black centred spot in area 2, a tornal black spot dividing a white spot. **Female-** like that of

male but larger and lighter in colouration and without any hair pencil.

Thaumantis diores diores- Male (Upperside)

Variation: Only the nominate subspecies occurs in India. It exhibits variation in size and extent of colouration of iridescent blue patch and other markings on wings.

Its following form is known in India.

f. *ramdeo* Moore- It is probably a dry season form. Upperside with the iridescent blue areas lighter and extending farther into cell; underside of hind wing paler and ocelli smaller.

Thaumantis diores diores- Male (Underside)

Wing expanse: Male, female 95-115 mm.

Habits: It is usually observed in couples or more in dense jungle. It appears during September-October. When disturbed, it flies over a short distance (de Niceville, 1894a). At rest, it sits with its wings closed. It displays beautiful metallic blue colouration.

Habitat and ecology: It is found in thick forests of low elevations upto 800m.

Food-plants: Grasses.

Distribution: India: Arunachal Pradesh, Assam, Nagaland, Sikkim, West Bengal. Elsewhere: Bangladesh, Myanmar.

Status: Not common.

58. *Discophora lepida* (Moore)

Enispe lepida Moore, 1857.
Discophora lepida (Moore): Bingham,1905; Evans, 1932; Talbot,1947; Wynter- Blyth,1957; Varshney, 1994.

Common name: Southern Duffer.

Diagnostic characters: Upperside dark brown; male fore wing with a series of three subapical blue spots, hind wing unspotted and central brand smaller, pale edged and very prominent; female with a subapical bluish white band and hind wing with yellow spots.

Morphological characters: Male: *upperside* dark brown. Fore wing with a subapical band of three bluish –white spots; two or three very small submarginal spots, fringes grey white or yellowish. Hind wing with a submarginal row of indistinct spots which may be absent or vestigial; a discal black brand, forming a rounded oval patch narrowed towards end of cell. *Underside* of fore wing with discal band straight with distal pale border; a submarginal curved, greyish white band, more or less distinctly defined. Hind wing with a submarginal maculate band, parallel to margin and greyish white as on fore wing; posterior ocellus with very prominent white centre. **Female**: *Upperside* paler than in male; fore wing with a prominent bluish white oblique band from costa to vein 4, three discal rows of three to four bluish white spots in areas lb, 2,3, and 4. Hind wing with three rows of small ochreous spots, the inner discal row not always complete. Outer margin narrowly ochraceous. *Underside* of female much paler than in male, but with markings almost similar those in male.

Discophora lepida- Male (Upperside)

Variation: Only the nominate subspecies occurs in India. It has seasonal variations with the following known DSF and WSF.

Discophora lepida- Male (Underside)

DSF f. *lepida* (Moore)- *Upperside* male of fore wing with subapical band of 5.5mm wide at vein 4 and spots larger; female with three submarginal spots sometimes ochraceous, *underside* paler than in male, and markings in distal areas very obscure.

WSF f. *significans* – *Upperside* male of fore wing with subapical band of 4mm wide at vein 4 and spots smaller. *Underside* deep reddish brown, paler in proximal half, and all markings well defined; *underside* of female with a prominent broad white outer border, submarginal band white to brownish-white; ground-colour paler ochraceous than in DSF.

Discophora lepida- Female (Upperside)

Wing expanse: Male, female 85-110 mm.

Habits: The butterfly inhabits dense bamboo jungle and does not fly until after sunset. The flight is swift and strong and it alights on leaves and bushes. The male has a powerful odour which can be detected as it flies past.

Habitat and ecology: It is rare in the bamboo jungles of southern India but very common during July-August.

Life history: The female lays three to ten or more eggs in parallel rows along the midrib on the underside of a leaf in very shady places. After hatching, larva lives in a cell formed by joining a couple of

leaves together with silk. The young larvae are gregarious. The body of larva is cylindrical or slightly fusiform. Its head is greenish-yellow, eyes black, body brown with a dorsal, broad and white band, flanked with conspicuous black marks and a yellow lateral mark on segments 6 to 11. Its head and body are clothed with long reddish or brown hair. The larvae live together until their last moult after which they live their own. In this stage each larva builds a shelter on the top of a leaf, first coating it with silk and fixing one or two leaves over it to form a cell. The larva makes several shelters before pupation which takes place near the ground or among dead leaves in the protection of some bamboo clump. Here the larva fixes its tail in a pad made on perpendicular stem, lying with the head up the stem. Then it becomes dirty white in colour, falls over backwards, so that its back is towards the stem, and changes into a pupa in that position. The surface of pupa is finely rugose and colour being semi-transparent yellowish. The pupa is with two elongate conical points, thorax convex and dorsally slightly indented, wing-sheaths rather flat, abdomen strongly arched.

Food-plants: Bamboos, *Dendrocalamus* and other Poaceae.

Distribution: India: South India. Elsewhere: Sri Lanka.

Status: Rare. The nominate subspecies is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

59. *Discophora sondaica* Boisduval

Discophora sondaica Boisduval, 1836.

Discophora tullia (Cramer): Bingham, 1905; Evans, 1932: Wynter-Blyth,1957

Discophora sondaica Boisduval: Talbot, 1947; Varshney, 1994.

Common name: Common Duffer.

Diagnostic characters: Larger. Upperside of fore wing with three rows of small bluish spots, with or without a yellow patch at end of

Discophora sondaica muscina- Male (Upperside)

cell, yellow patch (when present) usually enclosing a black spot and in male hind wing with a large prominent central black brand.

Morphological characters: **Male-** *Upperside* blackish brown. Fore wing marked with small bluish white spots, a post discal series of four or less than four spots, the anterior spot being larger, the others often vestigial, a second outer postdiscal series of four spots always present, the lower spot being smaller; a submarginal series of four or five spots placed nearer to the postdiscal spots than to the margin, a yellow patch at end of cell, yellow patch usually enclosing a black spot. Hind wing unmarked or with submarginal, vestigial, dull ochraceous spots; a large prominent central black brand not pale edged, small yellow spots absent, brand less distinctly defined measuring about 8mm from point of origin of vein 2 to vein 4, and about 9mm from inner edge in cell to outer edge at vein 3/4. *Underside* marked with various shades of brown to light ochraceous, closely striated with darker brown. Fore wing with a post-discal, heavy somewhat diffused dark band, limiting a more deeply coloured proximal area. Hind wing with two small ocelli, one in area 2 and another in area 6. **Female-** *upperside* of fore wing with markings white or bluish white, with or without a yellow patch at end of cell, yellow patch (when present) usually enclosing a black spot, a costal oblique patch reaching vein 5. Hind wing with three rows of ochraceous spots, those of the postdiscal

Discophora sondaica muscina- Male (Underside)

Discophora sondaica muscina- Female (Upperside)

row being usually sagittate; outer margin narrowly bordered with ochraceous. *Underside* as in male but much paler and less variegated, the markings ill-defined.

Variation: The species shows variation in number and size of white or bluish white spots and presence or absence of a yellow patch at end of cell.

The following two subspecies occur in India.

i) *D. sondaica muscina* Stichel- Upperside of wings with black or yellow spots and discal band not continuous. Southern India and North Kanara.

ii) *D. sondaica zal* Westwood (DSF)- Upperside of fore wing with spots bluish white in both sexes. Male-upperside fore wing with rows of spots not equally prominent and hind wing with spots. Female-upperside with yellow patch at end of cell, enclosing a black spot. Sikkim. The follwing forms are known.

Discophora sondaica muscina- Female (Underside)

a) WSF f. *indica* Staudinger- Male upperside of hind wing without spots and in female yellow patch absent at end of cell

b) DSF f. *zal* Westwood-Upperside of wings is paler brown than in indica, fore wing bears an additional spot outside the cell, discal row of bluish spots followed by postdiscal and submarginal rows of ochreous spots. Hind wing has three rows of somewhat obscure ochreous spots.

c) f. *spiloptera* de Niceville & Moeller- Male upperside of fore wing with yellow spots and, in female yellow patch present at end of cell but not enclosing black spot.

Wing expanse: Male, female 80-90 mm.

Habits: The butterfly during dawn and dusk and may fly at night. It keeps its own particular area. It is found at the edge or in clearings in the bamboo jungles. It takes short flights when disturbed. It usually breeds wherever bamboos grow. It emits an unpleasant smell when caught. It has two broods and their individuals appearing during September-April (Sikkim), May-August in Assam (Cachar) and March-October (Naga Hills).

Habitat and ecology: It is commonly found in the plains and at low elevations and is often found resting under the shade of large trees among the dead leaves on the the ground.

Life history: The larva is light brown-grey, with chocolate brown spots and rose coloured legs.The hairs on the body mouse grey. In shape the larva resembles that of *D. lepida* Moore. It lives on bamboos. The full-grown larva is 50mm long, colour black mottled with grey and with a rather broad yellowish dorsal line. White, suspended by the tail; labial palpi prominently projected ; The pupa is white and suspended by the tail. Its colour changes to dark brown a few hours before emergence. If pupa is green, there are yellow lines on the wing-sheaths, but if yellow, it is dotted with black The pupal stage lasts for three weeks.

Food-plants: Bamboos.

Distribution: India: Sikkim, South India, West Bengal. Elsewhere: Borneo, China (Hainan), Indonesia, Myanmar, the Philippines, South China, South-east Tibet and Thailand.

Status: Common. The subspecies, *D. sondaica muscina* Stichel is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY CALINAGINAE

Thorax clothed in part with orange or red hairs. Both fore- and hind wing with cells closed; in fore wing vein 11 arising from 10; in hind wing, prediscoidal cell present.

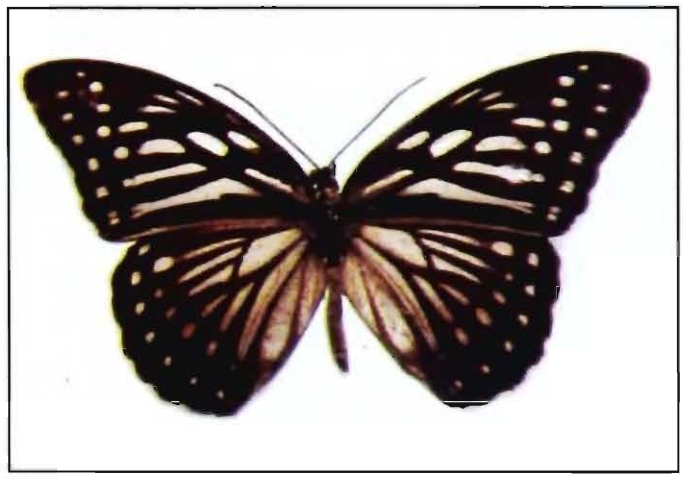
60. *Penthema lisarda lisarda* (Doubleday)

Diadema lisarda Doubleday, 1845.
Penthema lisarda (Doubleday): Bingham, 1905; Evans, 1932; Wynter-Blyth, 1957; Varshney, 1994.
Penthema lisarda lisarda (Doubleday) : Evans, 1932.

Common name: Yellow Kaiser.

Diagnostic characters: Larger, with wings broader.Upperside brownish black with white streaks and spots. Underside fore wing reddish brown and hind wing fulvous brown.

Morphological characters: **Male-** *Upperside* brownish black. Fore wing with a short basal stripe and two obliquely placed large oval white spots in the cell, a long white streak along dorsum from base to near tornus, successively shorter streaks in areas 1, 2 and 3 followed above it and around the cell by a curved series of 5-6 narrower streaks, a sinuous postdiscal series of rounded white spots in areas 2-7, spots often joined to streaks in areas 1, 2 and 5, a series of eight submarginal quadrate spots and posteriorly two spots closely placed, postdiscal and submarginal spots smallest in area 7. Hind wing with areas 1a, 1b and cell entirely white, streak in area 1b divided by a black vein, a series of five streaks in areas 2-6, a series of postdiscal rounded and submarginal quadrate spots, posteriorly the postdiscal and submarginal spots being smallest,



Penthema lisarda lisarda- Male (Upperside)

Penthema lisarda lisarda- Female (Upperside)

postdiscal spots in areas 5 and 6 joined to streaks. *Underside* of fore wing dusky brown becoming paler towards apex and purpurescent black in cell, white markings as on upperside but tinged with blue. Hind wing fulvous brown with white markings not well defined, discal streaks shorte, postdiscal spots small and submarginal spots cone shaped.**Female-** like that of male but larger and paler.

Variation: Only the nominate subspecies occurs in India. It shows variation in the number and size of white spots and streaks. It is a single brooded but in DSF fore wing apex is produced.

Wing expanse: Male, female 123-135mm.

Habits: This species is the largest of all the nympalids in India. It sits with its wings open. It feeds dung and moisture. It is mostly a single brooded and appears during May-August.

Habitat and ecology: It is confined to dense forests at low elevations of 600-1500m.

Distribution: India: Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim. West Bengal. Elsewhere: Bangladesh.

Status: Rare. This subspecies is given protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

61. *Calinaga buddha* Moore

Calinaga buddha Moore, 1857.

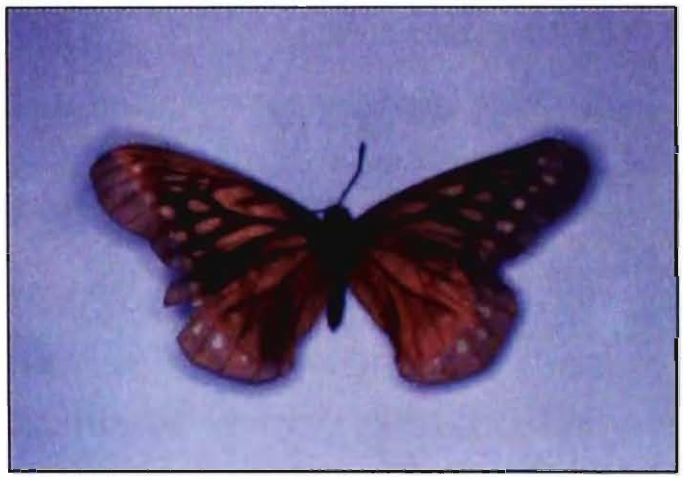
Calinaga buddha: Bingham,1905; Evans,1932; Wynter-Blyth,1957.

Common name: Freak

Diagnostic characters: Upperside of wings brown with a creamy white stripes/streaks and spots, veins blackish. Underside of apical third of fore wing and entire hind wing mostly yellow, both wings with veins chestnut-brown.

Calinaga buddha buddha- Male (Upperside)

Morphological characters: **Male-** *Upperside* of wings brown. Fore wing with a creamy white stripe in the basal half and beyond it a spot in the cell, same coloured stripes extending along basal two-third in areas 1a-1b, a small diffused spot each base of areas 4-5, a series of elongate spots in areas 2-10, becoming slender streaks in areas 9 and 10, a series of submarginal spots, the latter minute in areas 7-8. Hind wing with inside of cell and inner margin broadly whitish, the latter tinged with ochreous, diffused white spots at bases of area 4-7, a small rounded discal spot in area 3 and other three elongate spots in areas 4-6 followed by a series of submarginal spots and that in area 2 being smallest. *Underside* of fore wing with apical third yellowish and remaining brownish, with creamy white markings as on upperside but larger and diffused. Hind wing brownish yellow, paler at base and inner margin, creamy white markings not well defined, a discal elongated blackish narrow streak between veins 1 and 2. **Female-** almost like that of male but larger and lighter in colouration



Calinaga buddha buddha- Male (Underside)

Variation: The species shows variation in number and size of creamy white stripes/streaks and spots. It includes the following four subspecies (Evans, 1932). Varshney (1994) treated subspecies *buddha, gautama* and *aborica* as species.

Calinaga buddha gautama- (Upperside)

i) *C. buddha buddha* Moore- Upperside of anterior part of thorax orange. Underside of hindwing dull ochreous. Uttarakhand (Kumaon).

Calinaga buddha gautama- (Underside)

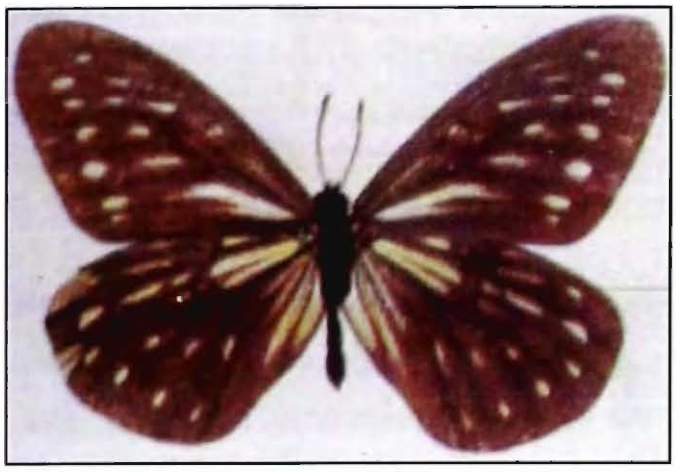
ii) *C. buddha gautama* Moore- Fore wing elongated; underside of hind wing pale brown. Sikkim.

iii) *C. buddha brahma* Butler- Thorax entirely orange; dark with pale markings reduced; underside underside of hind wing pale slate. Assam, Manipur, Nagaland.

iv) *C. buddha aborica* Butler- Upperside with wing markings very much reduced but sharply defined. Arunachal Pradesh (Abor Valley).

Wing expanse: Male, female 88-105mm.

Habits: It is mostly local and appears during March-July. When disturbed, it has flight like that of *Papilio*. This species mimicks the *Parantica sita* (Chestnut Tiger) of the subfamily Danainae.



Calinaga buddha aborica- Male (Underside)

Habitat and ecology: It is found on sandbanks in woodland streams up to an altitude of 1500m. It is confined to forests.

Distribution: India: Arunachal Pradesh, Assam, Manipur, Nagaland, Sikkim and Uttarakhand. Elsewhere: Pakistan.

Status: Least Concern (Gupta and Mondal, 2005). This species is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY ACRAEINAE

Wings sparsely scaled and spotted; cell of fore and hind wing closed by tubular veins; hind wing flat; and fore legs imperfect in both the sexes.

62. *Acraea issoria* (Huebner)

Telchinia issoria Huebner, 1818.
Pareba vesta Fabricius: Bingham,1905; Evans,1932; Wynter-Blyth, 1957
Acraea issoria (Huebner): Talbot, 1947.
Pareba issoria (Huebner): Varshney, 1994.

Common name: Yellow Coster.

Diagnostic characters: Upperside yellowish brown with black bar at end of cell in fore wing or with additional bar across cell and beyond cell, the outer black marginal bands of both the wings having ground coloured spots.

Morphological characters : **Male-** *upperside* of wings yellowish brown. Fore wing with a black bar at the end of cell, veins along the costal margin black, apical black border curved and broader at costa and narrowing towards vein1, this border bearing ground coloured spots and inwardly this border extending along veins and conical in areas1 and 2, a discal black spot in area 2 another larger one in area 1. Hind wing with a submarginal zigzag black line and joining with the slender marginal line along the veins, the veins black towards outer margin. *Underside* of both wings with veins black. Fore wing

yellow but paler towards the apex, black bar at end of cell showing through by transpancy, the black marginal border with ground coloured spots obsolete. Hind wing with a broad submarginal ground coloured lunulate band bordered on inner and outsides by black lines, a slender outer marginal black line continued along dorsum. **Female**- like that of male but with additional black markings on disc of fore wing and veins blackened on both fore- and hind wings.

Acraea issoria issoria- Female (Upperside)

Variation: This species shows much variation in the shades of groud colour and markings on wings. The ground colour may be fulvous, additional black markings like fore wing with a band at base along costa, black bar across cell and another oblique bar from costa beyond apex of cell and other black transverse marks on the disc. Hind wing may be with submargunal and marginal black lines broader. The upperside of female may be fuliginous black, a broad streak at base of cell, a quadrate spot at apex, a discal irregular series of elongate marks; hind wing may be with ground colour pale ochraceous having blurred and diffused submarginal and marginal lines.

Acraea issoria issoria- Female (Underside)

In India, there are two subspecies which mainly differ from each other by the extent of fore wing expanse.

i) *Acraea issoria issoria* (Huebner)- (45-85mm) Assam, Sikkim.

ii) *Acraea issoria anomala* Kollar - (45-65mm) Kulu, Kumaon.

Wing expanse: Male, female 45-85 mm.

Habits: Its flights is very slow and fluttering, slower than that of Danaines, hardly increasing speed when disturbed. It is fond of settling on leaves and flowers. This is an ugly butterfly.

Habitat and ecology: It lives in immediate neighbourhood of its food-plants, where it often swarms. It inhabits open and scrubby regions but not forest. It appears during June-July at elevations of 600-2150m.

Life history: The orange coloured eggs are laid in batches on the underside of leaf mostly in late June or July. The larvae hatch out after about 20 days. Initially, the larvae are blackish and spined, later developing a red head. The creamy-white larvae live gregariously and like the pupa and butterfly they are protected by the unpleasant smell and taste. They are attacked by the insect parasites. The winter is spent in larval stage and pupation take place early in June. The pupa is suspended by the cremaster with its head downwards from a twig or leaf of its foodplant. The pupa is white and marked with yellow and black. The pupal stage lasts for about 15 days.

Food plants: *Buddleja* sp., *Debregeasia saenab*, (Sansaru, Pincho, Tushiari, Stara, Tusarra), *Passiflora* sp., *Pouzolzia* sp, *Strychnos nux-vomica* (Nux-Vomica, Strychnine, Snake-wood), *Tectona grandis* (Teak, Sagun, Segun), *Urtica* sp.

Distribution: India: Assam, Himachal Pradesh, Meghalaya, Sikkim, Uttarakhand, West Bengal. Elsewhere: Bhutan, Myanmar.

Status: Not rare.

63. *Acraea violae* (Fabricius)

Papilio violae Fabricius, 1775.

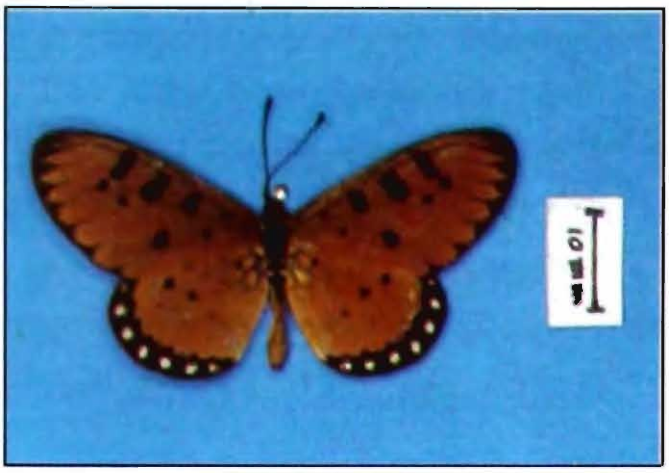
Telchinia violae (Fabricius): Bingham, 1905; Evans, 1932; Wynter-Blyth,1957

Acraea violae (Fabricius): Talbot, 1947.

Acraea terpsicore Linnaeus: Varshney, 1994.

Common name: Tawny Coster.

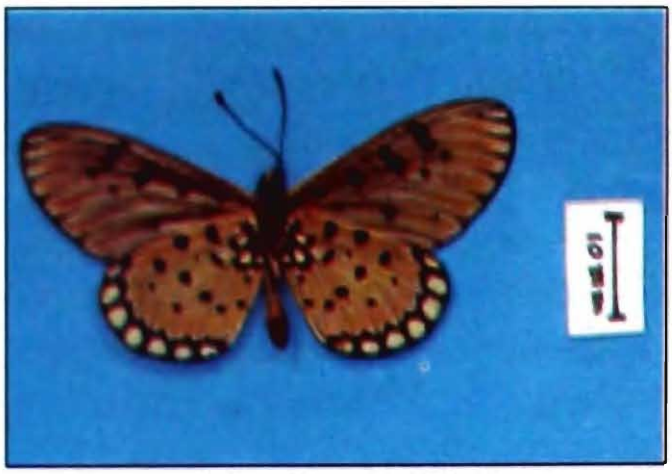
Diagnostic characters: Upperside tawny with narrow dark margin on fore wing; hind wing with marginal band black, bearing white spots. Cell and disc of both wings with black spots.



Acraea violae- Female (Upperside)

Morphological characters :

Male- *upperside* of wings tawny/brick red. Fore wing with an irregular black bar at the end of cell, a black transverse spot in middle of cell, postdiscal spots in areas 1b, 3-6 and 10, the spots in areas 4-6 almost parallel to end of cell, apical and outer marginal border narrowly black and decreasing in width at tornus, **s**. Hind wing with a basal series of 4-5 black spots, a small spot at end of cell and a subcostal spot above it, a discal series of obscure black spots, a minute postdiscal spot each in areas 4 and 6, a broad black marginal border with its inner edge crenulate and bearing small yellowish spots. *Underside* of both wings with ground colour paler tawny yellow. Fore wing apex orange yellowish bearing markings as on upperside but blurred and diffused, outer narrow marginal border inwardly sending projections along veins. Hind wing with markings well defined than on upperside, black at base of wing separated from basal black spots by 2-3 large yellowish-white spots, the submarginal spots larger and yellowish-white and not tawny. **Female-** *upperside* like that of male but ground colour duller, both wings having black spots larger and marginal black border



Acraea violae- Female (Underside)

broader; fore wing with anterior spots joining and forming an irregular oblique short band, hind wing with submarginal spots larger and whitish. *Underside* much paler and duller with markings as on upperside. Hind wing with well defined spots.

Variation: This species shows variation in number and size of black and white markings on wings.

Wing expanse: Male, female 50-65 mm.

Habits: This is a butterfly of low elevation. Its flight is slow and close to the ground. It visits flowers and settles frequently. It is a pest on fruits.

Habitat and ecology: This butterfly is common almost all the year round. It is found in forest clearings and open regions. It ascends 2150m, commonly in the south but very occassionally in the north.

Life history: The dome shaped eggs are laid up to 15 or so in a batch, on a young shoot or tendril. The larvae at first gregarious but separate in the third stage. They are very active and grow fast. They generally rest on underside of a leaf. The body of larva is cylindrical and greasy claret-brown in colour. It measures 21 mm in length and 10 mm in breadth (including spines of 3 mm in length). Pupation takes place on or near the food-plant.The pupa is elongate with its surface dull, slightly wrinkled and set with minute erect hairs. Its colour is white with pink and yellow shades. It measures 17 mm in length and 6 mm in breadth at the broadest part. Both larva and pupa have a disagreeable odour.

Food-plants: *Adenia hondala* (the Wild Passion Flower), *Aporosa lindleyana* (Valaka), *Castilla elastica* (Ule tree, Panama Rubber tree), Cucumbers (Cucurbitaceae plants), *Hibiscus cannabinus* (Decccan Hemp), *Passiflora edulis* (Passion Fruit), *Passiflora foetida* (Stinking Passion Flower), *Tectona grandis* (Segun, Teak), *Vitex pinnata*.

Distribution: India: Peninsular India, Punjab, Sikkim, West Bengal. Widely distributed in India. Elsewhere: Nepal, Sri Lanka.

Status: Common.

SUBFAMILY NYMPHALINAE

Butteflies of medium to large size. Antennae always at best partly scaled, with two grooves separated by a central ridge and bordered by two lateral carinae on the ventral surface; wings with terminal margins may be scalloped, crenulate or dentate, hind wing may be caudate; fore tarsi imperfect, brush like and useless for walking in both sexes, although usually longer and several segmented; male secondary sexual characters not strongly developed except in a few genera.

64. *Ariadne ariadne* (Linnaeus)

Papilio ariadne Linnaeus, 1767.

Ergolis ariadne (Linnaeus): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957

Ariadne ariadne (Linnaeus): Varshney, 1994.

Common name: Angled Castor.

Diagnostic characters: Upperside reddish brown with numerous single and regular black lines across both wings. Fore wing outer margin deeply concave between veins 3 and 5.

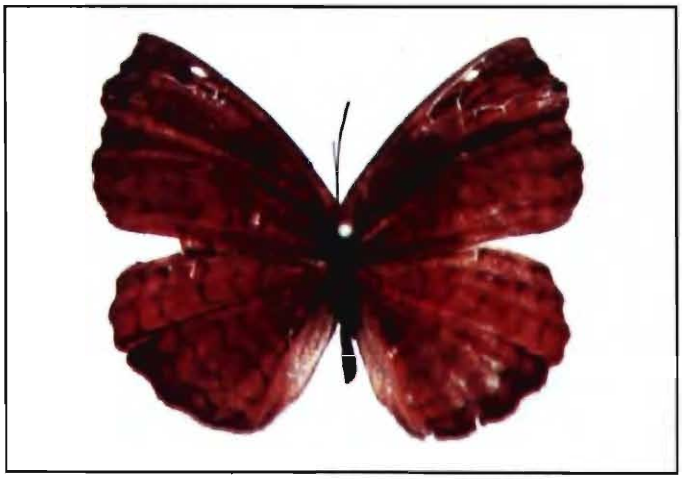
Morphological characters: **Male-** *Upperside* of wings reddish brown, fore wing with a prominent small white subcostal spot before apex, two or three dark brown marks in the cell, followed by subbasal, discal, two postdiscal, submarginal and marginal fine sinuous, single and regular black lines running from costa to inner margin, thick short black bars at end of cell; outer margin truncate at apex, deeply concave between veins 3 and 5 and tornus obtusely angulate. Hind wing with dark brown marks in cell, black bars at end of cell as on upperside, other subbasal, discal, two postdiscal, submarginal and marginal black lines as on upperside but from costa to vein1; outer margin scalloped. *Underside* of both wings reddish brown but with tint of brown, some chestnut brown spots or loop like marks at their bases, succeeded by subbasal, discal and postdiscal broad chestnut brown bands, these bands interruped by the male sex mark of

specialized scales on fore wing, extending to base of the wing, upwards into the cell and to vein 4; the surfaces of both wings crossed by a submarginal zigzag and a marginal irregularly sinuous dark brown line. Hind wing with a postdiscal band traversed by a series of transverse black spots in interspaces. **Female-** like that of male but slightly paler in colour and without the male sex mark.

Ariadne ariadne indica- Male (Upperside)

Variation: The species exhibits variaton in colouration of wings and veins 5 and 6 may or may not be conspicuous. It also displays seasonal variations.

The following two subspecies occur in India.



Ariadne ariadne pallidior- Male (Upperside)

i) *A. ariadne indica* Moore –(50-55mm). Upperside uniform. Male upperside of hind wing with veins 5 and 6 shining white and discal blck lines not running through them to costa. South India to Arunachal Pradesh. West Bengal. Bangladesh.

ii) *A. ariadne pallidior* Fruhstorfer- (55-60mm). Upperside more variegated in DSF. Upperside veins more black, veins 5 and 6 in hind wing not conspicuously white discal lines running to costa. Uttarakhand (Mussoorie). Myanmar.

Wing expanse: Male, female 45-60 mm.

Habits: The butterfly has slow sailing flight, around and in among bushes. The flight consists of a series of up and down beats of the

wings and followed by a period of sailing with jerky and irregular movements. They bask near their food-plants. Both *Apatura parisatis* and *Pseudergolis wedah*, resemble this species. It is a pest on oil seeds' plants.

Habitat and ecology: It is found in the drier open plains and lower elevations. It is widely distributed and is common everywhere except in the more arid northern regions and above 2300m in the hills and lower in the North-west Himalaya. During migrations, it may be found at higher elevations.

Life history: The larva is cylindrical and slender. Its colour is variable, sometimes green with longitudinal dark brown lines, or dark brown with an interrupted broad dorsal stripe of pure white, not extending to either end. The pupa is slender with its colour variable. It is rigidly attached by the tail, so that if the surface is vertical, the pupa stands out horizontally. The pupal stage lasts for 10 days.

Food-plants: Euphorbiaceae, *Ricinus communis* (Castor Seed Plant), *Tragia cannabina* (Ground creeper), *T. involucrata* (Indian Stiging Nettle).

Distribution: India: Arunachal Pradesh, Sikkim, South India, Uttarakhand, West Bengal, widely distributed in India except the arid North and North-west regions. Elsewhere: Myanmar, Sri Lanka.

Status: Common.

65. *Argyreus hyperbius* (Linnaeus)

Papilio hyperbius Linnaeus, 1763.

Argynnis hyperbius (Johanssen), Bingham, 1905; Evans, 1932; Wynter Blyth, 1957.

Argyreus hyperbius (Linnaeus): Eliot *et al*, 1992; Varshney, 1994.

Common name: Indian Fritillary.

Diagnostic characters: Upperside of wings tawny with transverse rows of blackbspots. Underside of hind wing dark green and light

brown, with silver bands broken into spots. Female, like *Danaus chrysippus,* with transvers rows of spots.

Morphological characters: **Male-** *Upperside* of fore wing rich orange yellow with black markings: a basal short bar, a medial broad loop and a broad bar in the cell, two spots at end of cell with the lower one broader, a zigzag series of large spots angulated outwardly in area 4 and inwardly in area 2, a smaller spot in area1, a postdiscal sinuous series of spots and those in area 1 and 4 being very small, a diffused spot in area 6 between the discal and postdiscal spots, a submarginal sinuous series of spots and marginal black line widened on veins followed by a tawny ground coloured line bordered with a black lunulate line. Hind wing upperside paler yellow with the black markings: a basal transverse obscure mark in the cell, another above it in area 7, a slghtly lunulate bar across middle of cell, a small spot outside the lower discocellular, a discal series of spots in areas 1-7 being sinuous posteriorly, a postdiscal series of spots in areas 2-6, a submarginal series of somewhat lunulate spots followed by a narrow marginal band traversed posteriorly by a series of blue and anteriorly by a series of ochraceous lunules. *Underside* of fore wing pale red but ochraceous towards apex, markings mostly as on upperside except- subcostal spot in area 6, upper two spots of postdiscal series , upper

Argyeus hyperbius hyperbius- Female (Upperside)

Argyeus hyperbius hyperbius- Female (Underside)

four spots of inner submarginal series and anterior portions of outer submarginal and of marginal line olivaceous brown; the upper two postdiscal spots centred with white, with a white spot on each side, upper four spots of submarginal series united to form a short curved band. Hind wing variegated with ochraceous, olivaceous brown and silvery white markings, the latter for the most part narrowly margined on the outer side by short black lines, the veins distinctly pale ochraceous, medial silvery markings forming a sinuous discal seires, followed by a curved postdiscal series of five olivaceous spots, each spot and the olivaceous brown quadrate patch near base of cell with a minute central white spot, a slender black submarginal line widened at veins followed by an ochraceous narrow lunular band and an outer slender black line; the submarginal black line bordered on inner side by a series of broad olivaceous-brown markings in the areas. **Female**- like that of male but differs by *upperside* of fore wing with apical half from costa to above tornus being black and inwardly suffused with purple or blue, a subapical broad white band from costa to submarginal series of black spots, four preapical white spots, the upper three bordering on each side and above of an obscure ocellus, an inner and outer submarginal series of slender white lunules. *Underside* of fore wing with markings mostly as on upperside but apex beyond white oblique band ochraceous green. Hind wing as in male but with markings broader.

Variation: The species shows variation shape of apex and vein 2 in fore wing of male, and white band and apical blue colouration on fore wing in female.

The following four subspecies occur in India.

i) *A. hyperbius hyperbius* (Linnaeus)- In male, fore wing with vein 2 not swollen and apex much produced. Female having fore wing white banded with dark blue apex and outer margin concave in the middle. Madhya Pradesh, Mount Abu. Pakistan, North Myanmar.

ii) *A. hyperbius castetsi* (Oberthuer)- In male, fore wing with vein 2 swollen but apex not produced. Female as male, duller and bases

darker; fore wing with white apex but without any blue. Palni Hills, Travancore.

iii) *A. hyperbius hybrida* (Evans)- Male like that of *castetsi*. Female normal, fore wing upperside with white banded dark blue apex but much darker and than usual, white band narrow and the apex only slightly produced. Nilgiris.

iv) *A. hyperbius taprobana* (Moore)- Darker. Male having fore wing with apex produced and vein 2 unswollen. Maldive Islands. Sri Lanka.

Wing expanse: Male, female 65-85 mm.

Habits: This is one of the beautiful butterflies in Peninsular India. The male is fast flier than the female. Both sexes settle very frequently on the ground, or on flowers. It opens and closes the wings gently in the sunshine. The female mimicks *Danaus chrysippus* (Plain Tiger).

Habitat and ecology: It is found mostly in the open regions, forest glades, gardens, etc, mostly above 1850m, flying throughout the year. In the north it occurs at elevations of 610 and 2745m during April-October. It is fond of flying round and round on hill topes. It is not found in the plains as its food-plants- species of Violets are not found below 915m in the Himalaya (higher in the South).

Life history: The head and legs of the larva are black but black colour of body is obscured by orange-tawny markings. The pupa has its head and wing-cases pale-red. There are ten pale metallic spots on the back. Its abdomen is dark pink but spines are faintly black-tipped.

Food-plants: *Antirrhinum majus* (Snapdragon), *Viola* sp. (Violets).

Distribution: Throughout most of the hill ranges of India, Assam, Chhattisgarh, Gujarat (Sourashtra), Madhya Pradesh, Rajasthan (Mount Abu), South India, Maharashtra, Madhya Pradesh (Pachmari Hills), Punjab, Sikkim, Uttar Pradeshh, West Bengal. Elsewhere: Maldive Islands, Myanmar, Pakistan, Sri Lanka,

Status: Common.

66. *Cethosia biblis* (Drury)

Papilio biblis Drury, 1770.

Cethosia biblis (Drury): Bingham, 1905; Evans, 1932; Wynter-Blyth, 1957; Varshney, 1994.

Common name: Red Lacewing.

Diagnostic characters: Upperside fore wing in either sex without a broad oblique discal white or yellowish band.

Morphological characters:

Cethosia biblis tisamena- Female (Upperside)

Male- *upperside* rich orange red with broad marginal black border on fore-and hind wings; fore wing with apical half black, cell crossed by three pairs of transverse black lines, a discal faintly marked series of linear black spots, two black spots between base and discal spot in area 1, beyond the cell three short obliquely placed white streaks close to costal margin, a postdiscal series of 4-5 lanceolate white loops and an outer postdiscal series of 7-8 white spots (reniform) and two upper of these spots indistinct, a marginal series of deeply indented white lunules. Hind wing small discal spots in areas 7 and 8, a postdiscal series of 6-7 black oval spots and that in inner area being elongate, a submarginal series of faint blackish spots placed in pairs between the veins, the broad black marginal band with white lunules is in fore wing, an additional white lunule defined on both sides with black at anal angle

Cethosia biblis tisamena- Female (Underside)

and the abdominal margin yellowish. *Underside* of both wings reddish ochraceous with their marginal borders dusky black; fore wing with cell crossed by two pale greenish bands, each band bordered on both sides with black and white lines, third pale greenish band at end of cell and margined on both sides with white and black lines, a pale discal band beyond the cell with black spots on its inner and outer edge, a postdiscal series of six white lanceolate spots, each of these spots outwardly defined with black and a black centre divided by a white line, the lanceolate spots followed by a pale whitish band bearing pairs of small black spots between the veins, the outer margin bearing yellowish white lunules margined inwardly and outwardly with black, each of the latter black lunule enclosing white partly. Hind wing red at base with a black short bar edged on both sides by white, a subbasal oblique pale green band bearing black lines in pairs, then a red band followed by a pale band broader anteriorly as continued from fore wing and bearing similarly black spots, then a fulvous band, followed by a series of white lunules enclosing black conical spots, each white lunule having black spots on both sides, a postdiscal white band bearing on its outer edge black spots in pairs, submarginal band light brown and marginal markings as in fore wing. **Female-** mostly like that of male, but ground colour on upperside varying from tawny to moss green.

Variation: The species shows variation in colouration of wings, size, shape and number of black and white markings on wings. It displays seasonal dimorphism.

The following three subspecies occur in India.

i) *C. biblis andamana* Stichel- (85-100mm). Upperside of fore wing with a white quadrate patch in area 3 instead of a horseshoe marking. Upperside of female mostly black and hind wing greenish white. Underside with the postdiscal black line broken into pairs of dots in each area. Andamans.

ii) *C. biblis nicobarica* Felder- Wing expanse less than that of *andamana*. Upperside white markings less prominent. Underside bands more heavily black edged, postdiscal black line continuous. Nicobars.

iii) *C.biblis tisamena* Fruhstorfer- (65-90mm). Upperside of fore wing with a discal series of 2-6 or 3-6 horseshoe markings complete. Female varies from red as in male to moss green. Sikkim. Myanmar.

Wing expanse: Male, female 65-90 mm.

Habits: The butterlfly has slow and leisurable flight. It is apparently protected on account of disagreable odour experienced if squeezed in the fingers and also by the display of strikingly warning colours of the underside. It is a pest on flowers.

Habitat and ecology: It flies throughout the year at low elevations and is confined to hills. It is found up to elevations of 2150m.

Life history: The larva is yellow with black at the back and 10 black rings at the segments. The head is black, provided with horns of the same colour and on each segment with four rows of fine black spines extending horizontally from the sides. The pupa is grey-brown, dotted with black, provided at the head with three curved horns and with tubercles and prominenceson the abdomen.

Food-plants: *Passiflora racemosa.*

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Sikkim, West Bengal. Elsewhere: Myanmar, Nepal.

Status: Common.

67. *Childrena childreni* (Gray)

Argynnis childreni Gray, 1831.
Argynnis childreni Gray: Bingham, 1905; Evans, 1932; Wynter Blyth, 1957.
Childrena childreni (Gray):Varshney, 1994.

Common name: Large Silverstripe.

Diagnostic characters: Upperside of both wings rich fulvous bearing black spots; hind wing with tornal (posterior marginal) blue suffusion. Underside of hind wing dark green with six silver bands of which the discal silver band being straight.

Childrena childreni childreni-Female (Upperside)

Morphological characters: **Male-** *Upperside* of both wings rich fulvous having black spots. Fore wing with two sinuous lines across middle of cell and another short broad bar not touching median vein, two spots at end of cell with the lower one larger, a discal series of spots angulated twice, outwards in area 4 and inwards in area 2 (faint and short black spot) and 1b (black spot normal), upper three spots of discal series united to form a short oblique band from costa to vein 5, a postdiscal sinuous series of black spots followed by a submarginal series of spots and a marginal narrow band broadening at the veins, this band traversed by a slender continuous line of fulvous ground colour, an elongate (horizontally) spot present in area 6 close to the spot of submarginal series; male sex mark of raised modified black scales along veins 1a, 1b and 2; a black streak along inner in distal half may or may not be touching the marginal band. Hind wing with a slight black mark at apex of cell, a discal series of six spots from costa to area 2 being angulated at area 4 and a faint black spot in area 2, a postdiscal series of five spots followed by a submarginal series of 8 spots of which the posterior 2-3 spots lunulate and last two spots often joined, marginal lines as in fore wing, the posterior portion of the marginal area below vein 5 indigo blue, marginal black band traversed by a series of light blue lunules up to area 4 and dusky fulvous anteriorly in areas 5-7. *Underside* red to crimson, fore wing with a brownish orange

Childrena childreni childreni-Female (Underside)

subapical band beyond that area being brown suffused with green bearing two separated short tranverse silvery white lines below costa to vein 5 (sometimes join at vein 5 to form a loop), other markings distinct and as on upperside, the spots of postdical and submarginal series above area 4 being green and black edging to outer margin replaced by an inner and outer slender interrupted black line. Hind wing rich shining green ochreous, crossed by several sivery white lines and bands bordered on one or both sides with black, a white fascia along vein 1a, basal band from costa to median vein, then dividing and rejoining lower down enclosing an annulated spot and continued along vein 1, with short cross-streaks to vein1a and lower to vein 2, a subbasal band from subcostal vein crossing the cell continued along vein 2, a slender silvery line at end of cell and along lower apex of cell to vein 2, a triangular spot at base of area 3, another band from the subcostal vein to the vein 5 and merging into a straight discal band running from costa to above tornus and then curved inwards along the inner margin, a slightly curved postdiscal lunular line and a narrow submarginal white line, followed by a marginal white and black lines, and then again white and black lunulate lines, cilia alternately black and white, the submarginal and marginal lines enclosing between them a black tornal spot and a ocellus in areas 2 and 3. **Female-** *Upperside* of both wings slightly paler; fore wing brown with black spots more rounded, no sex mark of raised modified black scales along veins 1b, 2 and 3; hind wing with the indigo-blue marginal patch extending up to vein 5. *Underside* of hind wing dark green with six silver bands and the discal silver band being straight.

Variation: The marginal blue suffusion varies on upperside of hind wing. It has season variations, the individuals of first brood flying during May- July and those of second brood from the end of September to October.

The following two subspecies occur in India.

i) *Childrena childreni childreni* Gray- (85-100mm). Upperside of hind wing having marginal blue suffusion broad and prominent. Assam, Manipur, Meghalaya, Nagaland, Sikkim, Uttaranchal. North Myanmar.

ii) *Childrena childreni sakontala* Kollar- (75-90mm). In male, upperside of hind wing having marginal blue suffusion reduced. Jammu & Kashmir, Himachal Pradesh, Uttaranchal. Pakistan (Chitral).

Wing expanse: Male, female 75-100 mm.

Habits: This is the finest of all the Indian Fritillaries. It flies very rapidly but settles frequently on the ground and on flowers.

Habitat and ecology: It is found along road, in glades and in open areas. It is never found below 1500m in the Himalaya and common only over 2150m. It ascends 3050m.

Food-plants: Brassicaceae, Compositae, *Viola* sp. (Violets) (Violaceae).

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Nagaland, Sikkim, Uttarakhand, West Bengal. Elsewhere: Nepal, North Myanmar, Pakistan.

Status: Common.

68. *Fabriciana kamala* (Moore)

Argynnis kamala Moore, 1857.
Argynnis kamala Moore: Bingham, 1905; Evans, 1932; Wynter Blyth, 1957.
Fabriciana kamala (Moore): Varshney, 1994.

Common name: Common Silverstripe.

Diagnostic characters: Upperside of wings golden yellow with heavy black markings; fore wing with veins1 and 2 ridged and clothed with specialized scales in male. Underside of hind wing ochraceous yellow dark green with five silver bands.

Morphological characters: **Male-** *upperside* of both wings golden yellow bearing black spots and markings; fore wing dusky at base, veins and veinlets prominently blackened, veins 1 and 2 ridged and clothed with black specialized scales indicating sex mark, two short sinuous bars across middle of cell followed by an inverted N-shaped

Fabriciana kamala-Male (Upperside)

mark, a discal series of large spots angulated outwardly in area 4 and inwardly in area 2, a slightly sinuous postdiscal series and a straight submarginal series of spots, a short oblique bar from costa to vein 6 and may be joining there with postdiscal series, the latter having the smallest spot in area 4, maginal narrow black band bearing in its middle ground coloured golden coloured line interruped at veins. Hind wing tinged in parts with yellowish green extending over cell and along vein1, a short streak at apex of cell, and another in area the below it, an irregular zigzag discal series of spots followed by a postdiscal row of five spots and a submarginal series of spots, the marginal black band as on fore wing but broader and more distinct. *Underside* of fore wing of ochraceous yellow, apex and postdiscal short subcostal streak in area 6 green, black markings mostly as on upperside but postdiscal series of spots with spots smaller in areas 1 and 4, and two upper indistinct white spots, a series of submarginal spots blurred with two upper spots being white, apex narowwly black exending along margin, a faint black line between the postdiscal series of spots and black margin. Hind wing ochraceous yellow dark green with five silver bands including the marginal one- a basal band of white spots form precostal vein to base area 1, a subbasal band from costa to lower apex of cell, a series of irregular discal spots with upper three spots distinct but spot bein g smaller in area 5, a postdiscal macular band continued up the dorsum to the base, spot being smaller in area 4, a submarginal series of

Fabriciana kamala- Male (Underside)

white spots, both the postdiscal and submarginal series of spots bordered on one or two sides by a slender blackline, the space between postdiscal and submarginal series bearing an obscure series of transverse blackish spots bordered outwardly with yellow, the inner and outer marginal dark green lines. **Female-** *upperside* with markings on both the wings mostly like those in male but broader, fore wing at base and area 1 shaded with greenish brown, the rest of the anterior part being ochraeceous, spots of discal series very large and continuous forming a zigzag band, the anterior two spots of the submarginal series being white. Hind wing with the posterior three-fourths bright green and ground colour of the rest of the anterior portion being ochraceous.

Variation: The species exhibits variation in ground colour of wings and the size and colouration of wing markings.

Wing expanse: Male, female 65-75 mm.

Habits: The butterfly is fast flier and frequently pitching on the ground or on shrubs, thistles, brambles and low-growing flowers. It is two brooded, one flying during May-June and the other in late September.

Habitat and ecology: It is found along roads, in glades, at the edges of forest and in open regions. It occurs at elevations of 1850-3050m in the North-west Himalaya.

Food-plants: *Viola* sp. (Voilets).

Distribution: India: Himachal Pradesh, Jammu & Kashmir, Sikkim, Uttarakhand. Elsewhere: Pakistan.

Status: Common.

69. *Vindula erota* (Fabricius)

Papilio erota Fabricius, 1793.

Cynthia erota (Fabricius): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957

Vindula erota (Fabricius): Varshney, 1994.

Common name: Cruiser.

Diagnostic characters: Upperside of male orange yellow, discal broad band of uniform colour in both wings; hind wing with a ocellus in areas 2 and 5. Upperside of female bluish green or dark greenish brown, with a prominent white band across the disc on both wings and other markings like those in the male.

Vindula erota erota- Female (Upperside)

Morphological characters:

WSF: **Male-** *Upperside* of wings bright orange yellow. Fore wing with olivaceous brown at base with the following black markings- three short sinuous lines in the cell, two slender lines on both sides of the discocellulars; an inner discal lunular broken line and a faint zigzag outer discal line, an inwardly curved series of small postdiscal spots, the latter largest in areas 5 and 6, followed by a submarginal line joining a white spot just below the costa and a black wavy marginal line. Hind wing with the inner discal line and a wavy marginal line as in fore wing, but the outer discal line faint posteriorly and submarginal line more wavy than in fore wing; the space between the two discal lines much paler yellow than the ground colour, an additional dark straight postdiscal fascia with a ocellus in areas 2 and 5, and a black dot in area 6, a lilac spot at the tornal angle, wing toothed at vein 4. *Underside* almost like that on upperside. Fore wing three short and broad paler bars in the cell, inner discal and submarginal reddish brown lines thickened and

Vindula erota erota- Female (Underside)

distinct, a white spot near costa on inner side or joining the submarginal line. Hind wing with the reddish brown post discal line oblique and straight from costa to tornus, the similarly coloured both the inner discal and wavy submarginal faint lines joining the postdiscal line above the vein 1b. **Female-** *Upperside* bluish green or dark greenish brown with markings similar to those in the male, and with a prominent white band across the disc.

Variation: The species displays variation in colouration of wings, discal line or band in hind wing and other wing markings. It shows seasonal variations. The DSF is small and lightly marked, fore wing not produced and hind wing hardly toothed. The WSF is large and heavily marked, fore wing produced and hind wing tailed. The differences are pronounced in specimens from North-east India.

The following three subspecies occur in India.

i) *V. erota saloma* Swinhoe- (95-100mm). In male, upperside of wings with bases blackish, middle of part of wing paler and yellowish. In female, upperside dark olive brown, hind wing with white band showing in areas 5 and 6. South India. Not rare.

ii) *V. erota erota* (Fabricius)- (90-110mm). In female, upperside of hind wing with bases green, discal band from costa to vein 2, marginal area broad ochreous brown. Sikkim. Myanmar. Not rare.

iii) *V. erota pallida* (Fabricius)- (90-100mm). Like *erota erota* but male much paler and female like DSF of *erota erota*. Andamans. Common.

Wing expanse: Male, female 72-110 mm.

Habits: This is a beautiful butterfly feeding in the fore-noon on *Lantana* and other attractive flowers. Later in the day, it flies fast and high. It frequents damp spots to suck up moisture. It is sun loving and bask on tree tops and high creepers. The male is commoner than the female. It is a pest on flowers.

Habitat and ecology: It is found at all elevations up to 2150m in the North-east Himalaya and below 2150m in South India in evergreen forests especially during wet months.

Life history: The larva is pale olive-green and much darker between the segments with six long thorns on each segment. The upper one is much the longest, but all have a yellow base. Head dark brown with two backward bent thorns. The full grown larva is 38mm in length. The pupa varies in various shades of brown. Thorax with distinct ridge and two wing-shaped lateral protuberances. There are green and silver spots on the back. The pupal stage lasts for 15 days.

Food-plants: *Adenia hondala* (Wild Passion Flower).

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, South India, Sikkim, West Bengal. Elsewhere: Myanmar and Sri Lanka.

Status: Not rare.

70. *Cynthia cardui* (Linnaeus)

Papilio cardui Linnaeus, 1758.
Vanessa cardui (Linnaeus): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957.
Cynthia cardui (Linnaeus): Varshney, 1994.

Common name: Painted Lady.

Diagnostic characters: Upperside of wings ochreous-red with black spots; fore wing with three median black spots on the ochreous-red area, the black apical area bearing three conjoined white spots followed by a curved series of four white spots.

Morphological characters: **Male-** *Upperside* of both wings ochreous red. Fore wing with basal area dusky black, dusted with golden scales, apical half of wing and marginal border black and rest of the wing ochreous orange, an irregular oblique band of two separate black spots across middle of cell, a black patch at base of area 2 and a curved transverse black bar across middle of area 1, black apical area bearing a short oblique white maculated band of three spots and a curved series of four white spots, followed by a marginal series of pale slender lunules. Hind wing with the basal, costal and inner areas dusky black,

Cynthia cardui- Male (Upperside)

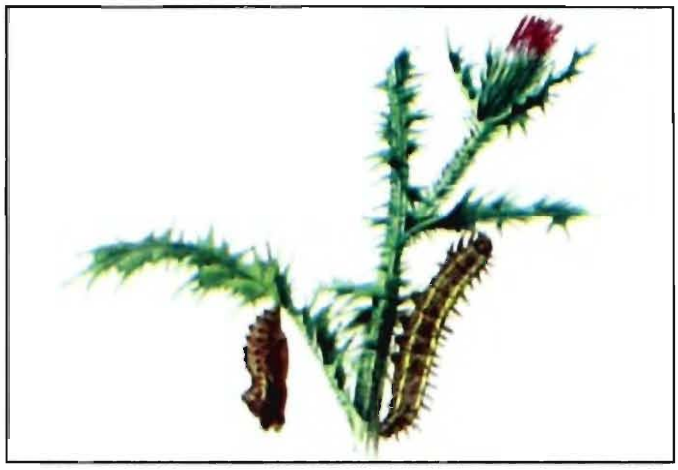
a discal dusky fascia from costa confluent midway with the basal area, followed by a series of five postdiscal black spots in areas 2-6 and a marginal series of black lunules, finally black spots at endings of veins. *Underside* mostly like that on upperside , but fore wing cell with basal area reddish and beyond it and discal area from vein 1 to vein 4 ochraceous orange, and rest of wing being greyish brown, apical area whitish. Hind wing mottled olive brown ochraceous, the olive brown markings edged with slender white, a postdiscal series of ocelli in areas 2-6, the ocelli in areas 3 and 4 being blue centred and others being black centred, all these ocelli having inner ochraceous and outer black rings. **Female-** Almost like that of male but paler and larger, upperside of fore wing with a white patch at base of area 2.

Variation: On account of migratory habits, this species shows variation in colouration of wings, size and number of black and whitish markings.

Wing expanse: Male, female 55-70 mm.

Habits: The butterfly flies strongly and swiftly in the open places, such as fields, waste land and gardens. It frequently settles on the ground or on a leaf and returning to these spots, when disturbed. During its feeding on low-growing flowers or basking on the ground, it keeps its wings half open and gently oscillating to and fro. It fights with another member of its own species. Under the unfavourable conditions, it migrates to other region of favourable conditions where it may become abundant.

Habitat and ecology: It is found everywhere, both on the plains down to sea level in the Sind Desert, and particularly on the hills. It ascends 4300- 4550m on the Shipki and Mintaka Passes.



Figs. A, B. *Cynthia cardui*, A- Larva, B- Pupa

Life history: The female alights on a leaf and lays its eggs, each egg on different leaves of the same plant. The caterpillar emerges from the egg but it does not eat the egg-shell. Each caterpillar, after outgrowing its confined abode, builds a separate nest near the summit of a stalk. The larva (Fig. A) is blackish brown with a longitudinal pale interrupted line on each side and the segments are armed with short branched spines. At first, it spins a thin web on the surface of the leaf by means of threads, completing the covering with a silken tent. When half grown, it leaves this and forms a more perfect nest drawing together leaves, buds and bitten fragments. Within this nest the larva rests with its head downwards. For pupation, the caterpillar does not go far, but frequently remains on the plant which has nourished it. It weaves an irregular shaped cocoon larger than its previous nest, formed of partially of dried leaves connected by open, angular, irregular, silken meshes. The pupa (Fig. B) is tuberculate and its head is bluntly cleft. The pupa is pale ochreous or brown and more or less spotted with yellow.

Food-plants: *Argemone mexicana* (Hollyhock, Barseem), *Artemisia vulgaris* (Indian Worm-wood), *Blumea* sp., *Corius arvensis, Debregeasia bicolor, Zornia diphylla,* many others of families Boraginaceae, Malvaceae.

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Jammu & Kashmir, Maharashtra, Punjab, Sikkim, South India, West Bengal, widely distributed in India. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Common.

71. *Hypolimnas bolina* (Linnaeus)

Papilio bolina Linnaeus, 1758.

Hypolimnas bolina (Linnaeus): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Great Eggfly.

Diagnostic characters: Upperside dark brown. Male upperside fore wing with an oblique and maculated bluish white band and two preapical white spots; hind wing with a large medial bright bluish spot broadly centred with white. Female upperside with a sinuous postdiscal series of white spots, a submarginal series of double cone-shaped white spots and a marginal series of white lunules on both fore- and hind wing.

Hypolimnas bolina- Male (Upperside)

Morphological characters: **Male-** (WSF) *Upperside* black; fore wing with an obliquely placed white maculated spot in areas 3-5 at or beyond of cell, this spot margined with bright bluish, two preapical elongate white spots, an inwardly curved postdiscal series of minute white dots ending anteriorly below the preapical white patches. Hind wing with a large medial bright bluish spot broadly centred with white, a postdiscal series of white minute white dots as in continuation with that on fore wing, marginal faint white lunules becoming obsolete anteriorly. *Underside* deep purplish brown; fore wing with some minute white flecks on

Hypolimnas bolina- Male (Underside)

Hypolimnas bolina- Female (Upperside)

below basal half of costal margin, an oblique discal series of three very slender streaks and elongate spots from costa to area 3, preapical spots and psotdiscal series of white dots as on upperside, a submrginal series of double cone-shaped spots between veins and marginal row of white lunules, both the submarginal and marginal series becoming obsolete anteriorly above vein 5. Hind wing with a discal series of white bluish maculated band from costa to inner margin, a postdiscal series of minute white dots as in continuation with that on fore wing, a submarginal series of double cone-shaped spots between veins, followed by an inner margnal series of white and outer dark brown lunules. **Female-** *upperside* dark brown; fore wing pale towards outer margin, a few small bluish subcostal spots above the cell, a postdiscal sinuous series of white spots placed between the veins, followed by a submarginal series of short transverse white narrow markings and a marginal series of white lunules, both these submarginal and marginal series becoming obsolete anteriorly beyond vein 5. Hind wing with basal half dark brown and distal half paler; a postdiscal series of white spots in areas 2-6, a submarginal series of double cone-shaped white spots between the veins followed by a marginal series of white lunules. *Underside* dull brown; fore wing with apical half paler, a few minute white bluish flecks on and one or two small white spots just below the basal half of costal margin, a postdiscal series of white spots and the spot being largest in area 1 but spots reduced to dots or obsolete above vein 3, submarginal double cone shaped white

Hypolimnas bolina- Female (Underside)

spots and marginal lunules obsolete above vein 5. Hind wing with basal half brown but distal half paler, a postdiscal series of faint white spots in areas 2-6, followed by a submarginal series of double cone-shaped white spots and a marginal series of white lunules but spots and lunules of these series being faint.

DSF **Male-** Similar to the male of the WSF but differs in having larger wing expanse; *upperside* of hind wing bearing larger bright bluish white patches and a more or less well-marked submarginal highly sinuous pale line.*Underside* ground colour hair (light) brown, fore wing basal half dark brown; hind wing with discal and submarginal markings broader, diffused and irrorated with dusky scales. **Female-** Similar to the female of the WSF but differs by the larger wing expanse; *upperside* of fore wing with one or two additional bright bluish white spots just below basal half of costa and submarginal transverse line of white spots much broader, the latter white spots being emarginate on inner side. *Underside* of hind wing entirely without the transverse broad discal whitish band or sometimes this band represented only by a pale shading.

Variation: Both sexes vary much in appearance. In male, upperside of hind wing with bright bluish white spot may be without pale centering in both the WSF and DSF. In female, upperside of fore wing with the discal oblique shining blue spots may be reduced to one spot in both the WSF and DSF. The underside of both the seasonal forms is also variable as to the presence or absence of the discal white band and submarginal white markings on the hind wing; the latter white markings may be much reduced in size..

Wing expanse: Male, female 70-110 mm.

Habits: The butterfly has a powerful and graceful flight. The male has a striking appearance with opening and closing wings in the sunshine on a prominent leaf or twig, often high up on a tree. It is a very pugnacius chasing away any butterfly approaching it. It prefers the same perch upon which it is found day after day. The female flies more slowly than the male and keeping close to the ground among bushes, in forest or in gardens, and low-growing species of Urticaceae. It rests on the underside of leaves with its wings closed over the back. It may enter into residential areas to settle in dark corners. It mimicks the Indian crow *Euploea core* (Cramer) of Danainae. It is a

migratory butterfly.

Habitat and ecology: It occurs in mainly open and lightly forested country. It is generally abundant in the wetter and forested parts of especially during the rains and it is not so common elsewhere but widely distributed and found almost throughout the plains. It ascends 1550m in the hills with occasional stragglers at about 2150m.

Life history: The larva is cylindrical and armed with nine longitudinal rows of fine branched spines. Its colour is very dark rich brown but head is light brown. The larva is occasionally found in the verandahs of dwellings. The pupa is dark earthy brown and mottled with a lighter shade. The pupal stage lasts for 10-12days or even up to 20 days.

Food plants: *Elatostema cuneatum, Fleurya interrupta* (Lal Bichua, Nettle), *Portulaca oleracea* (Common Purslane), *Sida rhombifolia.*

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Madhya Pradesh, Meghalaya, Punjab, Sikkim, Uttar Pradesh, West Bengal. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Common.

72. *Hypolimnas misippus* (Linnaeus)

Papilio misippus Linnaeus, 1764.
Hypolimnas misippus (Linnaeus): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Danaid Eggfly.

Diagnostic characters: Upperside dark brown. Male upperside fore wing with a large oblique broad white spot and a small preapical white spot, these spots surrounded by shining blue ; hind wing with a large medial rounded white spot. Female upperside tawny, fore wing with a white elongate and oblique white band on a more than half apical black area; hind wing with a prominent black spot in middle of area 7.

Morphological characters: **Male-** *Upperside* dark brown to black; fore wing with a large, oblique and oval white discal spot from below

vein 3 to vein 7 and a smaller preapical white spot, both these spots surrounded by iridiscent blue. Hind wing with a much larger rounded discal white spot also surrounded by iridiscent blue, two or three white specks at tornus, abdominal margin broadly orange and dusted with blackish scales.

Hypolimnas misippus- Male (Upperside)

Underside of fore wing with bases of areas 1 and 2 and cell rich light castaneous, a large, broad and oblique discal white spot extending from costa to middle of area1, the discal white spot being edged with diffused fuscous, cell with three upper white spots surrounded with black, basal half of costal margin fuscous and flecked with white, a narrow transverse short white mark beyond apex of cell, apical half beyond discal spot being golden brown, preapical spot as on upperside but not surrounded by blue, a postdiscal series of white spots below the preapical spot, a marginal sinuous black line separating an inner and an outer series of white lunules, the latter margined by black. Hind wing reddish ochraceous, a black spot at base of vein 8 defined by white lines, a very broad discal white band running from costa to inner margin and crossed at end of area 1a by a transverse black mark, bordered inwardly by black in area 7 and beyond middle of area 7 crossed by a short black bar, a postdiscal series of white spots in continuation of those on fore wing, followed by a marginal sinuous black line separating the inner series of subtrianular white spots on both sides of the veins and an outer

Hypolimnas misippus- Male (Underside)

Hypolimnas misippus- Female (Upperside)

series of white lunules, the latter edged with a black line. **Female-** *upperside* of both wings rich tawny; fore wing with apical half black, extending narrowly along costa to base and on outer margin, the inner margin of this black area crossing the cell obliquely and curving round to the tornus, the black area bearing an oblique band of a slender streak and three elongate white spots and a small rounded white spot in area 3 placed below the fourth spot, a short slender subcostal white streak before the oblique band, a white minute dot in area 5 below a transverse short series of three smaller subapical white spots, the black marginal border bearing an inner and an outer series of submarginal white lunules reaching vein 2. Hind wing with a rounded black spot in middle of area 7, the marginal black border bearing two transverse series of paired small yellowish white lunules. *Underside* paler tawny yellow; fore wing mostly like that on upperside but apical area beyond the oblique white band being ochraceous instead of black and the inner and outer series of submarginal white lunules, on the black marginal border, reaching dorsum / tornus. Hind wing with a basal black spot and a medial black subcostal spot, also a black spot at end of cell, a submarginal series of white spots, followed by a marginal black border with an inner series of yellowish-white small spots on both sides of the veins and an outer series of yellowish-white lunules, the latter prominent in both the inner and outer series.

Hypolimnas misippus- Female (Underside)

Variation: The species is distinctly sexually dimorphic. It shows variation in size and number of white, yellowish-white and black wing markings.

The female of *misippus* has the following two forms.

i) f. *alcippoides* Butler: it is a mimic of *Danaus chrysippus* f. *alcippoides* Fruhstorfer of the subfamily Danainae. The upperside of hind wing with white on disc. It is very rare.

ii) f. *inaria* Cramer: it is a mimic of *Danaus chrysippus* f. *dorippus* of the subfamily Danainae. The upperside of fore wing is without white-banded black apex. It is very rare but not like f. *alcippoides*.

Wing expanse: Male, female 70-85 mm.

Habits: The males and females differ in their habits. The male usually sits on a prominent leaf in sunlight and keeps watch on the territory, drives away any intruder and it returns to the same perch. It flies and settles much closer to the ground. It is attracted by the pungent smell of leaves of Cypress trees. The female is shy, keeping itself out of sight in scrub and jungle. It sits under a leaf, slightly at higher positions, and rarely found basking. It is found mostly near food plants. It exhibits Batesian Mimicry as the female is an excellent mimic of the Plain Tiger-*Danaus chrysippus* of Danainae.

Habitat and ecology: It is very common in regions of moderate rainfall and in open areas, forest clearings and paths, particularly during the monsoon months. It ascends 2200m in South India and not common above 1370m in the north, but occasionally observed at 2380m.

Life history: The larva is cylindrical and black with a darker black dorsat line. Its underside is dark olive-brown. The larval stage lasts for about 20 days. The pupa is pendulous, short and thick. It is light brown and without metallic spots, variegated and streaked, particularly towards the head and tail. The pupal stage is of 12 days.

Food-plants: *Abelmoschus, Abutilon* sp., *Elatostema cuneatum, Laportea interrupta* (Lal Bichua, Nettle), *Hibiscus* sp., *Portulaca grandiflora* (Rose Moss), *Portulaca oleracea* (Common Purslane).

Distribution: India: Arunachal Pradesh, Andaman & Nicobar Islands, Punjab, Sikkim, South India, Uttarakhand, West Bengal. Elsewhere: Myanmar, Sri Lanka.

Status: Common. This species is protected under Schedule I (Part-IV) as well as Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

73. *Junonia almana* (Linnaeus)

Papilio almana Linnaeus, 1758.
Junonia almana (Linnaeus): Bingham, 1905; Varshney, 1994.
Precis almana (Linnaeus): Evans, 1932; Wynter Blyth, 1957.

Common name: Peacock Pansy.

Diagnostic characters: Upperside of wings rich orange yellow, fore wing with three black lines in the cell and fouth one at end of cell. Both wings with ocelli in areas 2 and 5. Fore wing with the ocellus larger in area 2 and hind wing with the ocellus larger in area 5.

Morphological characters: DSF: **Male-** *Upperside* rich orange yellow; fore wing with a pair of black lines enclosing a short bar of ground colour across the cell, a black bar at end of cell but with ground colour being obsolete, another black bar beyond end of cell; the costal margin dusky black, the inner and outer submarginal lines and a marginal line being dusky black and closely placed; a discal large and minutely white centred ocellus with an inner and outer black ring in area 2, two similar smaller geminate subapical black ocelli joining with the black costal margin by a short black bar; wing produced apically and falcate. Hind wing with a smaller discal pale light tawny and white centred ocellus in area 2, a larger ocellus extending from vein 4 to above vein 7, the ocellus consisting of an outer black and inner yellow ring, the latter inwardly with a brown area bearing two white spots and outwardly with a bluish black area; the inner and outer submarginal lines and the marginal line as on fore wing but being wavy and well spaced, wing produced into a tail at tornus *Underside* of wings ochraceous brown; and crossed by

Junonia almana almana- Male (Upperside)

basal and discal pale sinuous lines, the discal line margined outwardly by a blackish shade, the latter bearing a row of obscure black spots and followed by a submarginal sinuos line. Fore wing with three short blackish sinuous bands in the cell including outer one at the end of cell, the basal and discal pale lines being sinuous, the discal line margined outwardly by a blackish shade, the latter bearing a row of obscure black spots and followed by a submarginal sinuous line. Hind wing with the basal and discal line and other markings as on fore wing but the discal line meeting the submarginal line posteriorly near the tornus. **Female-** like that of male but larger and paler.

Junonia almana almana- Male (Underside)

WSF: **Male-** *Upperside* like that of DSF, but the black markings deeper and heavier, the submarginal and marginal lines well defined. *Underside* of wings pale ochraceous. Fore with seven short sinuous blackish lines of which, five in the cell, one at end of cell and another beyond the cell, the latter two lines angulated inwardly at vein 4 and continued to the inner margin and the space between them forming a fascia, posteriorly this fascia becoming paler to whitish; the postdiscal ocelli, submarginal and marginal lines as on upperside but paler. Hind wing with a slender subbasal blackish line, a discal whitish fascia in continuation from the fore wing, the postdiscal ocelli, submarginal and marginal lines as on upperside but paler, the ocellus extending from vein 4 to 7 with a double pupil and centre. **Female-** almost like that of male but larger and paler.

Variation: This species shows the seasonal forms of very different shapes as well as markings on underside.

There are two subspecies found in India.

i) *J. almana almana* (Linnaeus)- (60-65mm). Upperside rich fulvous; hind wing with ocellus very large extending from vein 4 to vein 7. Underside of DSF leaf like and wings much produced. Underside of WSF ocellated and wings rounded. Andamans, widely distributed in India. Myanmar, Sri Lanka.

ii) *J. almana nicobariensis* (Felder)- It differs from the nominate subspecies mainly by the lesser wing expanse.

Wing expanse: Male, female 50-65 mm.

Habits: It inhabits gardens and is fond of flowers. The underside of dry season form is protective as it remarkabley resembles a dry leaf. It settles among rubbish or dead leaves with wings closed and bent over to one side displaying protective markings on wings. It presents a classical example of the most highly-developed seasonal dimorphism. It destroys the rice fields on a large scale (Varshney, 1978).

Habitat and ecology: It flies to elevations of about 2300m in the hills but very common at low elevations of below 1200m, especially in moist places and at the foot of Ghats.

Life history: The larva is cylindrical. Its head is blackish and slightly hairy and body being pale ochreous-brown. The second to last segments are armed with a dorsal, subdorsal, and two lateral rows of short, fine-branched spines. The pupa is brownish-ochraceous It is short and thick with head and thorax broad. Its thorax and abdomen bear short tubercular points dorsally.

Food-plants: *Barleria* sp., *Gloxinia* sp., *Hygrophila auriculata, Nelsonia canascens, Oryza sativa* (Paddy, Rice), *Osbeckia.*

Distribution: India: Andaman & Nicobar Islands, Punjab, Sikkim, West Bengal. Elsewhere: Myanmar, Sri Lanka.

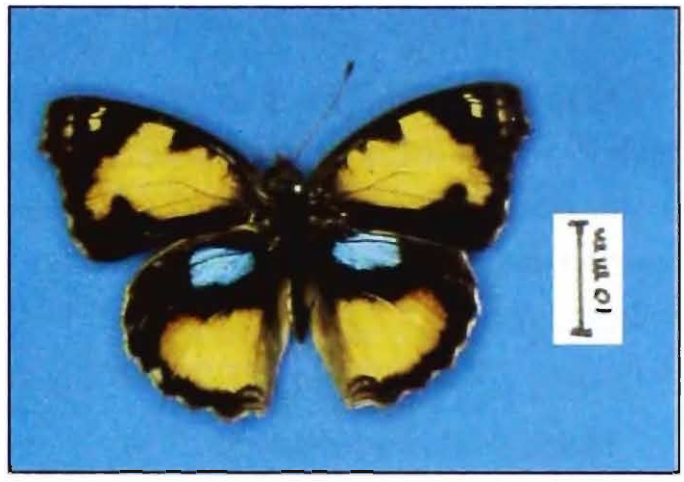
Status: Common.

74. *Junonia hierta* (Fabricius)

Papilio hierta Fabricius, 1798.
Junonia hierta (Fabricius): Bingham, 1905; Varshney, 1994.
Precis hierta (Fabricius): Evans, 1932; Wynter Blyth, 1957.

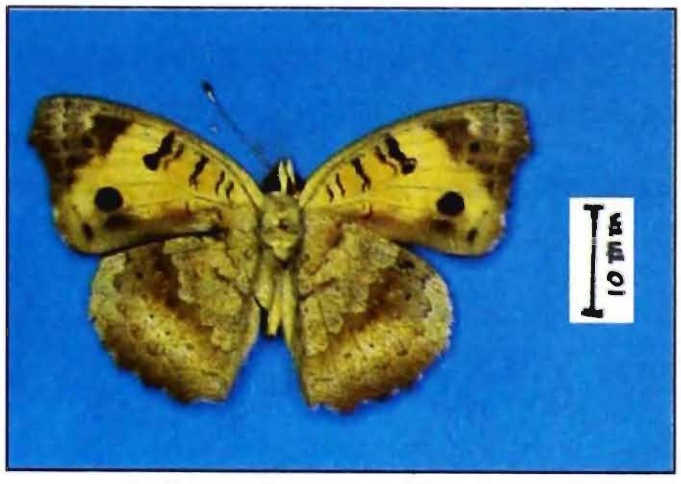
Common name: Yellow Pansy.

Diagnostic characters: Upperside of wings black; fore wing with a very large discal yellow spot and a black spot/ocellus in area 2; hind wing with a blue patch near base and a large subanal yellow patch. In female, yellow spot with black extensions in fore wing.



Junonia hierta hierta- Male (Upperside)

Morphological characters: **Male-** *Upperside* of both wings black with the outer margin yellow alternated with black cilia or fringe. Fore wing with a large subbasal bright yellow spot extending beyond the middle, then narrowed and bent downward, a black triangular projection from costa downward at discocellulars; two to three subapical yellow streaks, a series of submarginal yellow spots becoming obsolete posteriorly. Hind wing with a subbasal oval shining blue patch and a very large subanal yellow patch, two short black lunules edged with yellow at tornus. *Underside* of fore wing pale ochraceous brown, the discal patch paler ochreous; apical third, margin and dorsal margin up to base dusky brownish, four black lines in the cell and beyond cell a short black bar from



Junonia hierta hierta- Male (Underside)

costa to base of vein 4; a large postdiscal black spot in area 2 and a **similar** but a very small black spot in area 5. Hind wing with the **basal** half greyish ochreous bearing some obscure lunular marks, a **prominent** brown discal fascia with its margins sinuous, a series of postdiscal minute dots, followed by a submarginal and a marginal **wavy** slender pale brown lines, the margin below vein 6 being broadly **brown** shaded. **Female-** *Upperside* like that of male but duller. Fore **wing** with two black lines in the middle of cell and a broader one at **discocellulars**, the medial yellow patch paler and shortened basally, the blue centred black discal ocelli in areas 2 and 5, followed by a well defined submarginal pale line. Hind wing with an anterior blue spot on black area being small or ill defined, small blue centred black discal ocelli in areas 2 and 5 succeeded by a distinct submarginal pale line. *Underside* as in male but usually with the markings heavier and well defined.

Variation: The species shows variation in colouration of wings and size of yellow and blue patches and other markings. It has seasonal variations and the individuals of DSF are strongly irrorated with dusky scales.

There are two subspecies found in India.

i) *J. hierta hierta* (Fabricius)- (45-55mm). Smaller. India. Pakistan, Sri Lanka.

ii) *J. hierta magna* Evans- (50-60mm). Larger and brighter. Andamans, Sikkim. Myanmar.

Wing expanse: Male, female 45-60 mm.

Habits: This is one of the prettiest of the Indian butterflies. It prefers hottest and sunniest places and is particularly fond of dry river beds, stony uncultivated ground and roads. It flies just above the ground, often settling on flowers and on the ground.

Habitat and ecology: It is very common at low elevations and on the plains, especially in dry and arid regions. At the higher elevation, it flies only from spring to autumn. It is less common in forest and above 1220m but found at as high as 2750m in hilly areas.

Life history: The larval ground colour is dark brown or grey with a broad dorsal stripe formed of minute white and blue spots but spines black. The pupa is dull reddish and abdomen with a dorsal and lateral row of small blackish points.

Food-plants: *Barleria lanceolata, B. rubra, Hygrophila auriculata, Justicia* sp.(Common weed).

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Punjab, Sikkim, West Bengal, widely distributed in India. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Very common.

75. *Kallima inachus* (Boisduval)

Paphia inachus Boisduval, 1836.
Kallima inachus (Boisduval): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Orange Oakleaf.

Diagnostic characters: Upperside of wings mostly deep blue; fore wing with an orange band and black tip. Underside resembling a dry leaf, the apex of fore wing and tornus of hind wing narrowly produced in male and more so in female.

Morphological characters: **Male-** (DSF)- *Upperside* of wings dark violet-blue to deep steel-blue; fore wing with area 1a, 1 to near apex, basal half area 2 and extreme bases of areas 3, 4 and the cell rich violet blue, the latter bordered along the discocellulars and in areas 2, 3 and 4 by black, a very broad oblique discal orange band from costa to the apices of the areas 1 and 2, the latter spaces thickly irrorated with duskey violaceous black scales, apical third purpurascent black, a small hyaline white spot in middle area 2 and a also similar preapical whiter spot, a submarginal black zigzag line from middle of area 3 to the inner margin. Hind wing with more uniformly violet blue, the costal margin and and apex broadly brown, and irrorated with black scalesinner margin brown, a ridge of long brownish hairs along vein

Kallima inachus inachus- Male (Upperside)

1 extending to the inner margin, a submarginal black zigzag line, tornus produced into a tail. *Underside* of both wings very closely resembling a dry leaf, ground colour usually yellowish brown, rusty or greyish with shades of brown; a brownish discal line edged on both sides by white, their surfaces having scattered blackish dots or patches giving appearance of fungus like or lichenous growths. **Female-** apex of fore wing and tornus of hind wing narrowly more produced in male and more so in female to form the tip and the stem of the leaf.

Kallima inachus inachus-Male (Underside)

(WSF): **Male and female-** *Upperside* mostly like that of DSF but smaller, colours richer and darker, fore wing with the orange discal band broadly bordered with black inwardly. *Underside* of individuals from heavy rainfall areas having ground colour very dark ochraceous brown.

Variation: The species shows variaton in colouration of wings, width of discal orange band. It shows marked seasonal dimorphism.

The following two subspecies are found in India.

i) *K. inachus huegeli* Kollar- DSF much paler than WSF. Upperside of hind wing with prominent submarginal dark line. Kashmir, Kumaon, Pachmarhi.

ii) *K. inachus inachus* (Boisduval)- DSF not much paler than daker WSF. Assam, Sikkim.

Wing expanse: Male, female 85-110 mm.

Habits: The leaf like underside of this butterfly is one of the most wonderful example of protective resemblance among the insects. When it is settled on a twig or branch with its wings closed then it is almost impossible to distinguish it from the surrounding foliage. Its resemblance to dry leaf is more pronounced in the DSF. Its flight is rapid and erratic. When disturbed, it flies off very fast for a short distance and then suddenly pitching into a tree or bush and vanishing from sight. It is very fond of settling on sap exuding from trees, or on over-ripe fruit, especially jak and mangoes, and will readily come to pieces of sponge soaked in toddy or any form of alcohol. It is two-brooded and flies from April to June and again after the rains.

Habitat and ecology: It is found in regions of heavy rainfall in the thick forests of mountainous and hilly places, at low or moderate elevations of about 2450m in the Himalaya.

Life history: The eggs are small, marked by cream-yellow, vertical ribs. The larva hatches out after five days, The larva is velvety- black and covered with rather long yellowish hair. The first moult takes from 2-4 days, the bristles are replaced by spines and the head is armed with two long horns, the colour black. After three more days the second moult takes place, the spines being now yellowish in colour., but still short. After the third moult the spines are quite long and the body is spotted with orange-yellow; in the final stage the colour of the body is velvety black, the spines reddish and segments covered with yellowish hair. The duration of the larval stage is altogether about 22 days. The pupa is simple and pale brownish buff, variegated with slaty irrorations. Its thorax is slightly keeled and abdomen bears small dorsal conical points. The pupal stage lasts for about 10 days.

Food-plants: *Girardinia diversifolia* (Himalayan Nettle), *Persicaria orientalis* (Prince's Feather), *Prunus persica* (Nectarine, Peach) *Quercus* sp. (Oak) and *Strobilanthes capitata*.

Distribution: India: Assam, Bihar, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Eastern Ghats as far south as river Godavari, Orissa, Punjab, Sikkim, West Bengal. Elsewhere: Myanmar.

Status: Not rare.

76. *Nymphalis xanthomelas fervescens* (Stichel)

Vanessa xanthomelas fervescens Stichel, 1908.
Vanessa xanthomelas fervescens Stichel: Evans, 1932.
Nymphalis xanthomelas (Denis & Schiffermueller): Varshney, 1994.

Common name: Large Tortoiseshell.

Diagnostic characters: Upperside tawny; fore wing with black spots or tortoiseshell markings; hind wing with a large black spot at mid-costa, a black submarginal band bordered outwardly by a bluish and two ochreous broken marginal lines.

Nymphalis xanthomelas fervescens-Male (upperside)

Morphological characters: **Male**-*Upperside* of wings rich orange yellow. Fore wing with basal half costa dusky black and flecked with brown, two black spots in the cell, a quadrate subcostal black spot just beyond the cell followed by another irregular costal black spot, three to four balck discal spots, two small postdiscal black spots in area in the submedian interspace, a submarginal sinuous black band and marginal dusky band flecked with golden brown, spaces between the costal black spots and submaginal band being yellow. Hind wing with a large irregular black spot at mid-costa, a submarginal sinuous black band followed by a bluish and two ochreous broken marginal lines. *Underside* of both wings dull ochraceous brown, densely striated with brown and black, the basal half and broad margin much darker. The characeristic feature or unqueness of this species is that upperside and underside of its wings are densely hairy. **Female**- mostly like that of male but paler and larger.

Variation: The species exhibie variation in colouration wings, the size and number of wing markings. It has two broods and, therefore, displaying seasonal variations.

Only one subspecies, *Nymphalis xanthomelas fervescens* (Stichel) occurs in India.

Wing expanse: Male, female 60-70 mm.

Habits: The butterfly appears first in early spring, flying until late May near Shimla; but further east there is another brood after the rains.It is particularly fond of sunning itself with open wings on paths, low rocks and warm earth. It comes to water and sap It is greatly attracted by freshly cut pine wood.

Habitat and ecology: It is found both in open and lightly forested regions at elevations of 610-3350m.

Life history: The larva is cylindrical and slightly hairy. Its colour is dark purpurescent-brown, almost black and palest beneath. Its surface bears two dorsal slender yellowish macular lines, a single similar lateral line, the subdorsal and sublateral areas are longitudinally speckled with numerous irregular shaped yellow dots The spines are black. The head is quadrate and black, vertex sharply indented in front, slightly hairy, front and cheeks bearing several small pointed tubercles. Third to last segments are armed with a dorsal row of short spines, and three lateral rows of long rigid branched spines.

Food-plants: *Celtis australis* (Kharak, Khirk), *Pistacia integerrima* (Kakra, Kakri), *Salix elegans* (Shruby Willow).

Distribution: India: Himachal Pradesh, Jammu & Kashmir, Uttarakhand, West Bengal Elsewhere: Pakistan.

Status: Not rare.

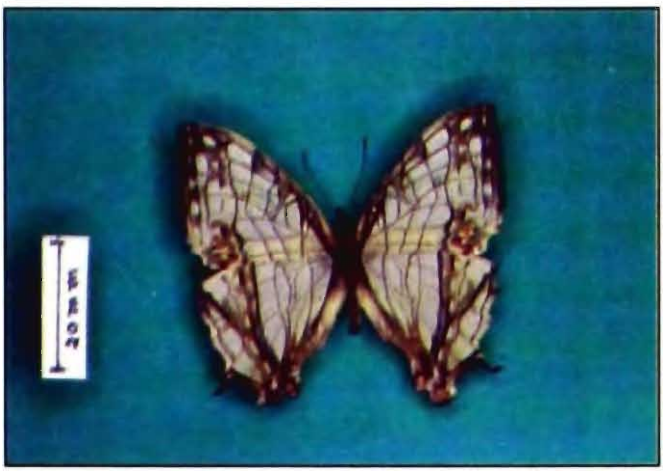
77. *Cyrestis thyodamas* Boisduval

Cyrestis thyodamas Boisduval, 1836.

Cyrestis thyodamas Boisduval: Bingham, 1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Common Map.

Diagnostic characters: Wings broad and irregular in outline. Upperside of both wings white to pale ochraceous in male but yellowish ochraceous in female; with map like ochraceous markings on wings in both sexes.



Cyrestis thyodamas thyodamas- Male (Upperside)

Morphological characters:
Male- *Upperside* of wings whte to pale ochraceous; fore wing with costal margin ocraceous at base and fuscous beyond, four slender and irregular sinuos transverse black lines, three to four fine short lines crosssing the cell, an incomlete series of postdiscal white centred fuscous rings in the areas (interspaces), these rings tinged with ochreous near the tornus but interrupted in areas 3 and 4, followed by two marginal black lines enclosing fuscous spots ending at veins between them and not reaching dorsum, apex broadly fuscous. Hind wing with three **to four** transverse black lines, a fine black line at end of cell, a pair of postdiscal broad black lines shaded with light sepia brown between the lines and forming bands, the outer line incomplete and broken, succeeded by two irregular black lines, a submarginal prominent black lineand posteriorly a black marginal line, the inner margin broadly fuscous at base, the apical half and the tornal area rich ochraceous, a black tipped tail at vein 4 dusted with white, an anal lobe at vein 2 and anal angle bearing numerous

Cyrestis thyodamas thyodamas- Male (Underside)

irregular ferruginous and steel blue spots. *Underside* like that of upperside, and markings on upperside showing through by transpancy. Hind wing with ferruginous markings more distinct at anal angle and anal lobe, the latter with a prominent black spot in the middle. **Female-** mostly like that of male but larger and yellowish ochraceous.

Variation: The species varies in colouration on wings, extent of apical and marginal dark areas, orange tornal area; complete or incomplete postdiscal lunular line and discal lines with black area between them in area 4.

The following five subspecies occur in India.

i) *C. thyodamas andamanica* Wood-Mason – Upperside of wings with all heavier markings; fore wing with two discal lines joined by the dark area in area 4; hind wing with tornal orange area much more extensive and darker. Andamans.

ii) *C. thyodamas ganescha* Kollar- Upperside of wings usually white in male and yellow in female. Upperside of fore wing with apical and marginal dark areas narrower and dark brown. Kashmir, Kumaon.

iii) *C. thyodamas indica* Evans- Upperside of wings with ground colour not yellow; fore wing with apical and marginal dark areas distinctly bluish grey. South India.

iv) *C. thyodamas tabula* De Niceville- Upperside deep rich fulvous, markings as in *andamanica* but with a complete row of postdiscal lunular brown spots. South Nicobars.

v) *C. thyodamas thyodamas* Boisduval- Upperside of wings white. Upperside of fore wing with apical and marginal dark areas much broader and brown. Sikkim. Myanmar.

Wing expanse: Male, female 50-60 mm.

Habits: This butterfly is fragile and sails very slowly in a jerky and irregular manner. It often assumes a position high up on a prominent leaf from which it takes short, sailing flights. In danger, its flight becomes extremely erratic and after the crisis is over, it seeks

protection among the foliage of a tree and settles on the under surface of a leaf. A similar position is adapted when it shelters from a storm or goes to rest for the night. It visits damp patches and flowers. It is a vegetable pest in the early stage.

Habitat and ecology: It is found near the streams, wetter hilly jungle regions from plains level to 2440m, where its food-plants, species of Figs are found.

Life history: The eggs are beautiful and high domed-shaped or almost conical, with an aperture at the top fitted with a deeply dentate flat cap. The larva is slender, cylinderical and smooth. Its colour is reddish brown with a broad green band on the side from the 5th to the last segment. The pupa is brown with fine dark striae. It is suspended by the tail. The pupa is angular with aflttened process on the back on segments 5 to 8 and the head is produced into a long snout.

Food-plants: *Ficus benghalensis* (Banyan), *F. glomerata* (Gular, Dumur), *F. indica, F. memoralis, F. palmata* (Anjiri, Khemri), *F. religiosa* (Peepul).

Distribution: India: Arunachal Pradesh, Assam, Jammu & Kashmir, Peninsular India, Sikkim, Uttarakhand. West Bengal. Elsewhere: Myanmar,

Status: Not rare.

78. *Euthalia aconthea* (Cramer)

Papilio aconthea Cramer, 1777.

Euthalia garuda (Moore): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957

Euthalia aconthea (Cramer): Corbet & Pendlebury, 1992; Varshney, 1994.

Common name: Baron.

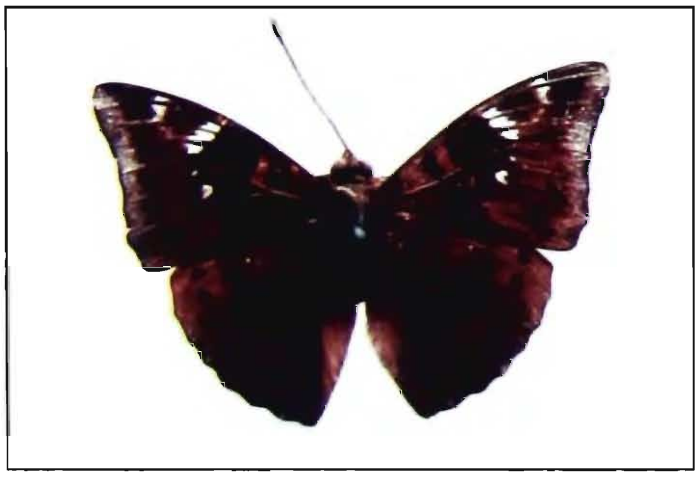
Diagnostic characters: Male upperside greenish brown; fore wing with darker markings and more or less five discal white spots in

areas 2-6. Female paler brown, fore wing with discal white spots larger in areas 2-6. In both sexes, upperside of hind wing with a series of well defined and well separated submarginal black spots.

Morphological characters:

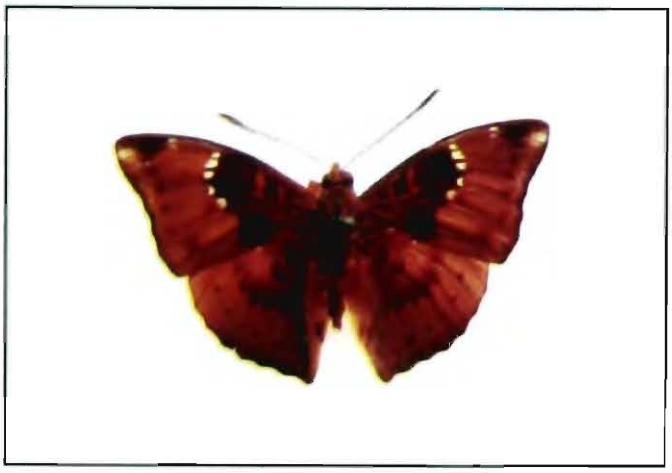
Euthalia aconthea aconthea- Female (Upperside)

Male- *Upperside* glossy greenish brown. Fore wing with two short black lines at base, a black loop in middle of the cell, another black loop beyond apex of cell, a discal dark brown band from middle of costa to inner margin and angulated outwardly in area 4, this band bordered outwardly by five white spots, followed by a reddish brown fascia, two preapical white spots, a submarginal and a marginal blackish bands. Hind wing with two lunule shaped dark brown loop like marks in the cell, a curved dentate discal band elongate spots from mid costa to innner margin followed by a submarginal series of small blackish spots and outer margin near anal angle blackish. *Underside* light chocolate brown, greyish at bases of wings; fore wing with five slender black lines in the cell, a small black spot below the median vein, discal and preapical spots as on upperside, followed by a postdiscal series of diffused black spots and a series of marginal bluish-grey spots. Hind wing with four black lines in the cell, and above cell lie a small spot and two oval black marks, a postdiscal series of faint blackish diffused spots and a series of submarginal small black spots, margin above vein 5 with bluish-grey spots. **Female-** *Upperside* like that of male but



Euthalia aconthea acontius- Male (Upperside)

pale brown with greenish gloss; fore wing with white discal spots larger. Hind wing with a submarginal series of black spots larger than in male. *Underside* mostly like that of male but ground colour more ochraceous and markings larger and more diffused.

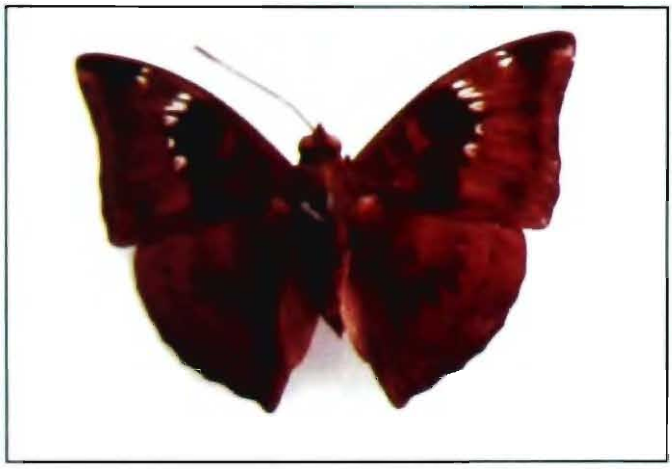


Euthalia aconthea anagama- Male (Upperside)

Variations: The shows variation in the colouration of wings, size and number of black and white spots and bands on wings.

The following five subspecies occur in India.

i) *E. aconthea aconthea* (Cramer)- WSF dark; male upperside of fore wing with spots complete and prominent. WSF female upperside of fore wing with spots as in male. DSF female upperside of fore wing with spots at end cell very large and confluent, spots in area 2 and 3 may be small or absent. Assam. Myanmar.

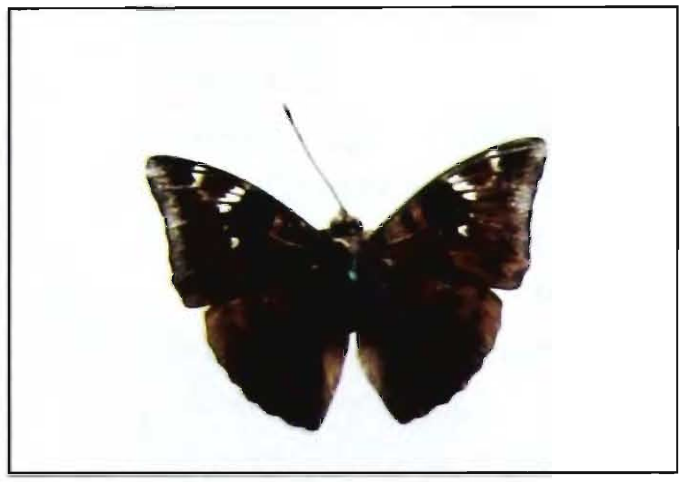


Euthalia aconthea meriodinalis- Male (Upperside)

ii) *E. aconthea acontius* Hewitson- Very large. Male dark and discal spots obscure, apical spots prominent and outer discal band wide. Female with complete discal band, but more diffused and linked Y-wise to the apical spots; discal band contiued widely on hind wing between the dark discal lines. Andamans.

iii) *E. aconthea anagama* Fruhstorfer- Small and pale. Male upperside of fore wing with discal spots small but those beyond end cell always present. Female upperside of fore wing with discal spots small and dusky, spots in areas 2 and 3 small or absent. Kangra, Kumaon, Mumbai, Orissa.

iv) *E. aconthea meriodinalis* Fruhstorfer- (65-80mm) Very large. Male upperside of wings with basal area dark, discal spots small or absent; discal area dusted whitish. Female upperside of wings with discal spots large, white and discal area beyond prominently dusted whitish. North Kanara, South India.



Euthalia aconthea suddhodana- Male (Upperside)

v) *E. aconthea suddhodana* Fruhstorfer- Darker than *anagama;* upperside of fore wing with discal spots smaller. Sikkim, West Bengal. Bangladesh.

Wing expanse: Male, female 55-80 mm.

Habits: The butterfly has a strong and rapid flight. The male basks on tree tops whereas the female mostly keeps to lower levels. It settles sometimes on underside of leaves. It has territorial habits, returning to the same spot. It visits damp patches, rotten fruits, toddy and sap. It is a pest on fruits.

Habitat and ecology: It is found throughout in its range where its food plants- Mango and Cashew nut trees grow, i.e. on the plains and upto elevations of about 1200m in the hills, and stragglers at higher elevations of about 2300m.

Life history: The larva is green with yellow dorsal stripes and similar rings on every segment, the lateral feathery hairs not tipped with black. The larva eats but little, grows very slowly and rests motionless. Its body with the pale dorsal line resembling the mid rib of the leaf, while the lateral branched spines for the other veins of the leaf on which it is resting, exhibiting a remarkable example of protective colouration, structure and habit combined. The spines are shed in each moult, and at their place appear blunt tubercles which

rapidly develop into well- known feather-shaped hairs. The pupa is green, angular and its head provided with two fulvous horns.

Food-plants: *Anacardium occidentale* (Cashewnut), *Bryonia* spp., *Mangifera indica* (Mango), *Morus* sp., *Streblus asper* (Siamese Rough Bush).

Distribution: India: Andaman & Nicobar Islands, Assam, Sikkim, West Bengal, South India, Maharashtra, Orissa, widely distributed In India. Elsewhere: Myanmar, Sri Lanka.

Status: Common. The subspecies is given protection under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

79. *Euthalia lubentina* (Cramer)

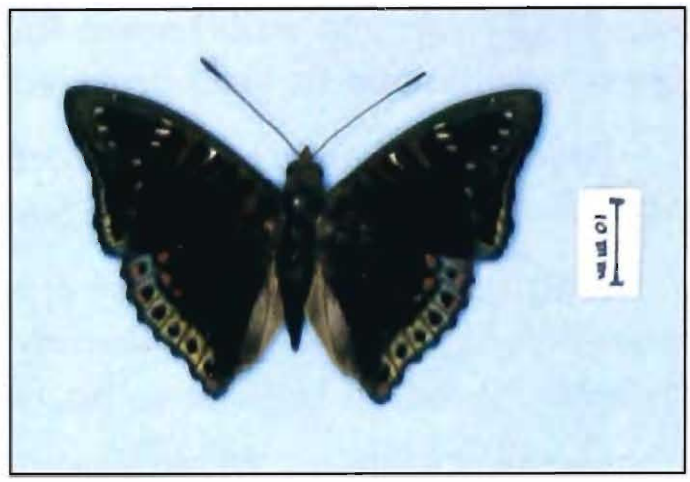
Papilio lubentina Cramer, 1779.

Euthalia lubentina (Cramer): Bingham, 1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Gaudy Baron.

Diagnostic characters: Upperside dark greenish brown; male fore wing with Y-shaped marking of white spots and hind wing with pale greenish submarginal band bearing black spots; female fore wing with an oblique discal band of irregular white spots and three subapical white spots and hind wing without black spotted pale greenish submarginal band.

Morphological characters: **Male-** *Upperside* dark greenish brown; fore wing with short black bars, one white bar and two dull scarlet interspaces in the cell, three white spots beyond the cell, a Y-shaped series of small white spots in distal half of wing, a marginal black fascia having in its middle a narrow ochraceous diffused fascia. Hind wing with a lunular black loop near the apex of cell area, a curved postdiscal series of 4-5 crimson spots bordered ouwardly with black, followed by pale greenish border bearing subquadrate black spots with three anterior and a tornal spots edged outwardly crimson, margina border black. *Underside* of fore wing greenish purple brown



Euthalia lubentina indica- Male (Upperside)

suffused with ochreous brown apically, markings mostly like those on upperside but more distinct and larger, two small black spots at base, basal half of costal margin crimson two black streaks in areas 1a and 1b and another in area 2. Hind wing ochreous brown and greenish brown anally, precostal vein black, with four scarlet spots, three spots bordered with black spots on two sides and fourth one bordered with black spots on three sides, costal and inner margin crimson, a postdiscal series of light crimson spots with inner edges black, followed by a submarginal series of black spots having anterior 3-4 spots edged on inner side with crimson. **Female-** mostly like that of male.but paler. *Upperside* of fore wing with crimson bands obscure in the cell, a black bordered sinuous short broad white towards end of cell, a Y-shaped marking of male replaced by an oblique discal series of large and irregular white spots from middle of costa to area 1 near tornus, and three subapical white spots, the white spots of marginal band prominent below vein 3 but becoming obsolete anteriorly. Hind wing with ground colour suffused with greenish blue on distal posterior half, markings mostly like those in male. *Underside* brown; fore wing with markings as on upperside but with two additonal small black spots at base of cell. Hind wing with 2-4 subbasal crimson spots bordered with black, followed by a discal series of 5-6 crimson spots bordered on both sides with black, and other markings as on upperside.

Euthalia lubentina indica- Male (Underside)

Variation: The species shows variation in the colouration of wings, size and number of spots and width of band.

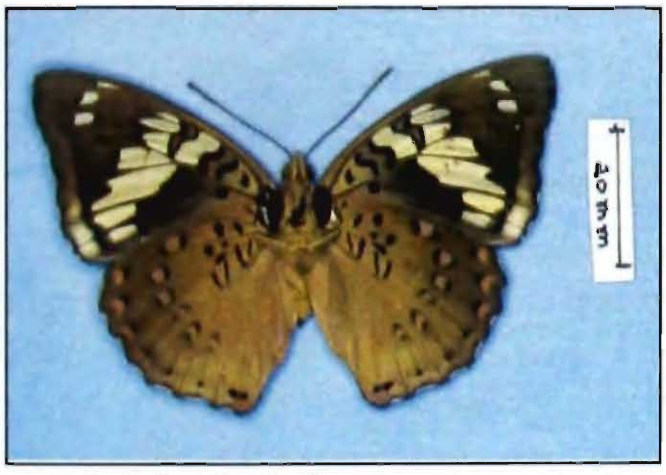
Euthalia lubentina indica- Female (Upperside)

There two subspecies found in India.

i) *E. lubentina arasada* Fruhstorfer- Upperside of male nearly uniform dark green. Upperside of female more brilliant pale green, underside of fore wing with band narrow and sharply defined. South India.

ii) *E. lubentina indica* Fruhstorfer- Upperside uniformly dark. It has considerable seasonal forms. Kangra, Mumbai, West Bengal. Bangladesh.

Wing expanse: Male, female 60-80 mm.



Euthalia lubentina indica- Female (Underside)

Habits: The butterfly is found in wet and forested areas. Both sexes settle on tree-tops. The females are more abundant than males which love to sip the moisture from wet spots in the road. They come to water and are attracted by fruit and sap.

Habitat and ecology: It is not usually found in open areas or on the plains proper. It is very common at low elevations but ascends 1500m-3050m.

Life history: The larva is of grass-green colour with a dorsal row of large purplish-brown angulated spots each with or without a small pure white diamond-spot in its middle. The pupa is green but with two lateral brown marks, each with a dirty-white centre.

Food-plants: *Dendrophthoe falcata* (Banda, Baramanda), *Scurrula parasitica.*

Distribution: India: Arunachal Pradesh, Himachal Pradesh, Maharashtra, North-east India, Peninsular India, Sikkim, Uttarakhand, Uttar Pradesh, West Bengal. Elsewhere: Bangladesh, Myanmar, Sri Lanka.

Status: Generally not common but locally abundant. This species is is included in Schedule IV of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

80. *Moduza procris* (Cramer)

Papilio procris Cramer: 1777.
Moduza procris (Cramer): Bingham, 1905; Varshney, 1994.
Limenitis procris (Cramer): Evans, 1932; Wynter Blyth, 1957.

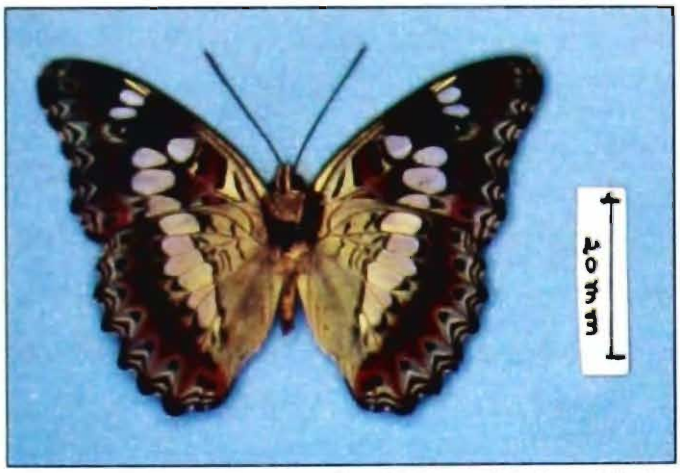
Common name: Commander.

Diagnostic characters: Upperside reddish brown; a prominent white discal band on both fore-and hind wing; fore wing with two wavy black lines on marginal border; hind wing with a postdiscal and a submarginal series black spots.

Morphological characters: **Male-** *Upperside* reddish brown; a prominent white discal band on both fore- and hind wing; fore wing with three slender black lines in the cell, below these lines also three black lines between the veins 1 and 3, a white spot at apex of cell, a slightly curved discal white maculated band below the vein 4, the latter posterior two spots being smaller, discal band bordered on both sides by black, beyond the cell discal area being triangularly black, with 4-5 subapical white spots, the latter anterior spots being very small having below the two larger ones and the lowest one smallest, a submarginal serires of black spots bordered on outside by white lunules, followed by two wavy marginal black lines, the latter may be fused sometimes. Hind wing with four slender black lines in the cell with a black spot in each of interspaces above them, a discal white band bordered both on inner side and outreside by black, followed a

Moduza procris procris- Male (Upperside)

postdiscal and a submarginal series of black spots, two wavy marginal black lines as in fore wing. *Underside* with markings mostly as on upperside but more clearly defined, the white discal band on both wings bordered on inner side by faint black but on on its edge having black lunules. Fore wing with the base pale olivaceous, wavy white lines on the black margin broader and prominent. Hind wing with basal two-thirds pale olivaceous, a postdiscal series of black spots as on upperside but a series of submarginal black centred white spots margined by white lunules, followed by two wavy black marginal lines enclosing a white line between them. **Female-** Mostly like that of male but larger and paler, the white discal band on both wings bordered on inner side by faint black but on its outer edge having black lunules.



Moduza procris procris- Male (Underside)

Variation: The species exhibits variation in colouration of wings, the size and number of spots and bands on wings.

The following three subspecies occur in India.

i) *M. procris undifragus* Fruhstorfer- Upperside of fore with a large white spot at end of cell, discal band narrow, submarginal band reddish brown and narrow; hind wing with discal narrower than in fore wing. Underside darker. South India.

ii) *M. procris procris* (Cramer)- Like that of *undifragus*, but upperside with all bands wider. Underside paler and more irrorated with violet. Uttarakhand (Dehra Dun). Myanmar.

iii) *M. procris anarta* Moore- Larger. Upperside with black markings wider; fore wing with a very small spot at end of cell and sometimes the spot may be absent. Andamans.

Wing expanse: Male, female 60-75 mm.

Habits: The butterfly is fond of visiting damp patches and garden flowers of Tagetes, Marigold, etc. It settles with its wings spread on leaves close to the ground or when feeding on salts and moisture. It keeps its wings closed when resting or feeding on the flowers.

Habitat and ecology: This is a low elevation butterfly occurring at elevations of 300-1800m. It is found in forested regions of heavy or moderate rainfall, along the river valleys and streames in the hilly regions. It may also be found in open areas and around human habitations.

Life history: The butterfly lays egg at the point of a leaf. On hatching, the young larva proceeds to eat the point, leaving the mid-rib untouched. The young larva is slender and cylindrical. It is dark brown and evenly clothed with short spinous tubercles. After its last moult it is dark brown. It prolongs the midrib by adding particles of excrement to the point of it. It may change the leaf and after the first two stages, it goes to other leaves for food. In the last stage, the larva rests on the underside of a leaf. There are generally two or three, sometimes even as many as a dozen, larvae on a single tree. The caterpillar wanders a little before pupation and fixes itself on to the undersurface of some leaf where it spins a copious wad of silk to hang by. The pupa is occasionally attached to perpendicular stem or branch. It is dark brown and its abdominal part is slender with small dorsal tubercles. The pupal stage lasts 10 days. The larva of *M. procris calidasa* is pale greenish yellow or reddish. The pupa is reddish purple-brown and its wing-cases are dilated.

Food-plants: *Cadaba fruticosa, Cinchona* sp., *Mitragyna parvifolia, Mussaenda frondosa* (Bedina, Nagballi), *Neolamarckia cadamba* (Kadamba), *Ochreinauclea missionis, Prunus amygdalus* (Almond), *Wendlandia heynei* (Chaulai), *W. thyrsoidea.*

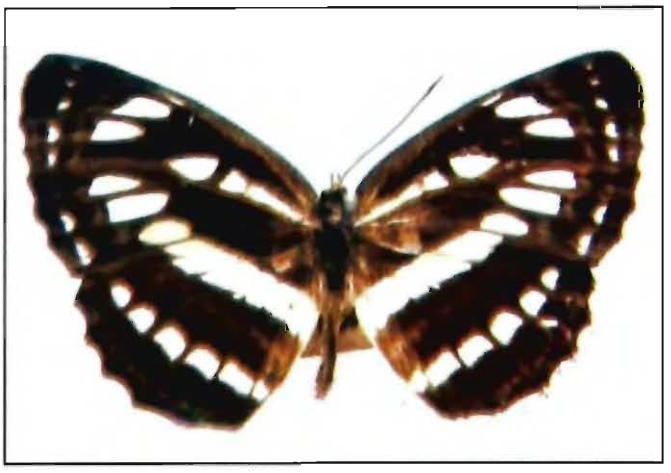
Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Madhya Pradesh, Peninsular India, Sikkim, Uttarakhand, West Bengal. Elsewhere: Myanmar, Sri Lanka.

Status: Not Rare.

81. *Neptis hylas* (Linnaeus)

Papilio hylas Linnaeus, 1758.
Neptis eurymone (Westwood): Bingham, 1905.
Neptis hylas (Linnaeus): Evans, 1932; Wynter-Blyth, 1957; Eliot, 1969.

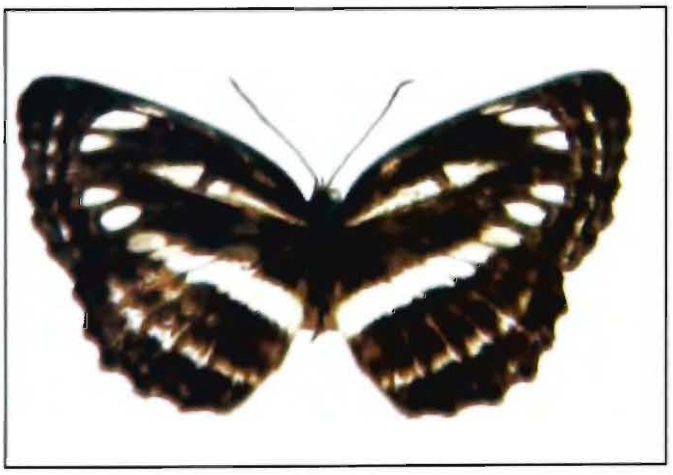
Common name: Common Sailer.



Neptis hylas varmona- Male (Upperside)

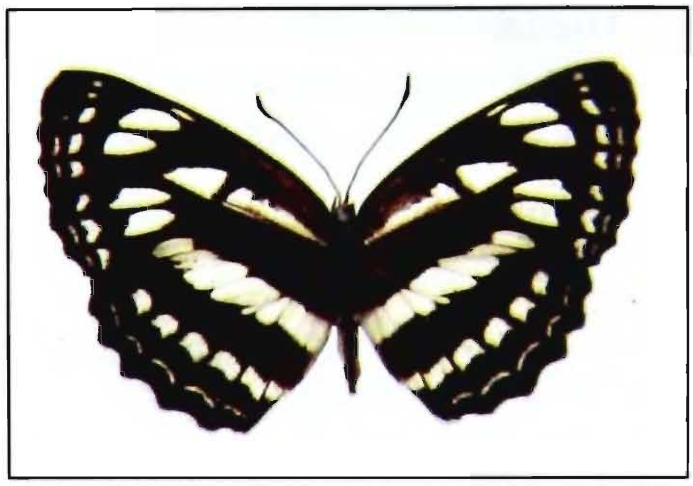
Diagnostic characters: Upperside of wings dark brown or black, fore wing with a white cell streak and a separate spot beyond, costal streak in discal band very short, discal spots in areas 2 and 3 not in line a with spot in area 5; hind wing with the discal band not widening at costa. Underside with black edgings prominent.

Morphological characters: **Male-** *Upperside* of wings black with markings white. Fore wing with white cell streak divided into a basal streak and a triangular spot beyond being broad and outwardly sharp, a sinuous discal series of spots but spot absent in area 4 , the costal streak in discal band very short, a postdiscal series of whit spots followed by a



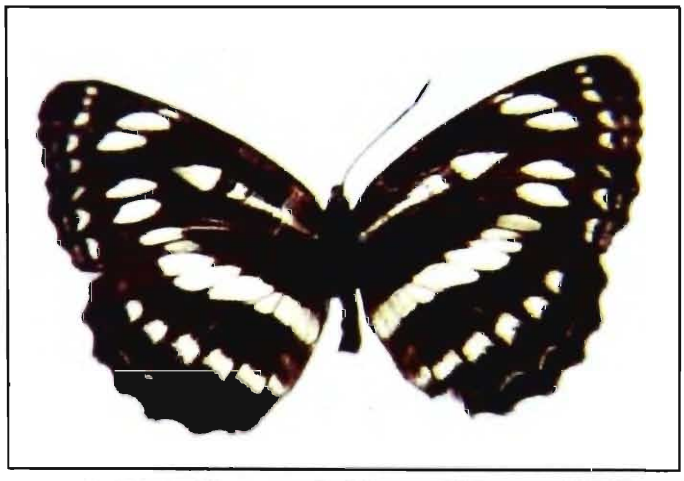
Neptis hylas andamana- (Upperside)

submarginal series of indistinct white spots, the latter obsolete anteriorly towards costa. Hind wing with a curved subbasal band, usually of even width, the discal and submarginal lines paler, the postdiscal series of well separated quadrate spots of which the anterior and posterior most being smallest.



Neptis hylas nicobarica- Male (Upperside)

Underside of wings pale golden ochraceous to dark ochraceous or almost chocolate; white markings as on upperside but broader and defined in black. Fore wing with areas 1b and 2 from base to apex shaded with black, the postdiscal series of small spots on its either side with narrow white markings. Hind wing with a basal white streak on costal margin, a more slender white streak below the former streak, the discal and submarginal pale lines of upperside replaced by narrow white lines with more narrower black margins. **Female-** almost like that of male but larger and paler.



Neptis hylas sambalinga- (Upperside)

WSF: It differs from DSF in the more narrower white markings and in the slightly darker ground colour and broader black margins to the spots and bands on the underside.

Variation: The species varies much in the ground colouration, size and number of white spots, bands and streaks on the wings.

The following five species occur in India.

i) *N. hylas varmona* Moore- Upperside of wings with white markings broad and sharp. Underside of wings rather dark ochreous and fore wing beyond cell with veins prominently black. Peninsular India (North Kanara, Coorg, Nilgiris, Madras Presidency). Sri Lanka. Very common.

ii) *N. hylas kamarupa* Moore- Upperside of wings with markings broad. Underside of wings bright golden ochreous and veins not blackened. Assam, Sikkim, West Bengal. Very common.

iii) *N. hylas andamana* Moore – Like that of *kamrupa;* upperside of hind wing with postdiscal band narrow and underside of hind wing with inner discal band more prominently black edged. Andaman & Nicobar Islands (Andaman Islands, Great Coco Island). Common.

iv) *N. hylas nicobarica* Moore- Upperside of fore wing spots in areas 2 and 3 directed to apex. All markings very broad. Underside ochreous and white markings along margin broader, hind wing with inner discal band constricted at ends. Car and Central Nicobars or Northern and Central Nicobars. Common.

v) *N. hylas sambalinga* Evans- Upperside of wings with markings reduced, but submarginal spots distinct, the hind wing with central (discal) band narrower. Underside darker, hind wing with the black edging to central (discal) band broader. South Nicobars (Little Nicobar and Pulo Condul). Common.

Wing expanse: Male, female 50-60 mm.

Habits: The flight of this species is typical of the genus, with a few flicks of the wings it sails gracefully along with the wings held horizontal. In the hot and dry weather, it rests on wet patches or damp stones to suck up moistures. At rest or in hides, it keeps its wings closed over the back in the usual manner.

Habitat and ecology: It is very common in woods, gardens, damp places and forested nullahs in the hills. It is found everywhere except in the most arid regions of the north-west and north. It flies throughout the year and ascends to 2700m.

Life history: The butterfly lays the egg on the upperside of a leaf and usually at the point. The larva on emerging eats the egg-shell and then moves to make a bed for itself upon the extreme point of midrib. It gnaws a lot of pieces of the leaf and hangs them by silken threads from its perch. As the larva grows it lengthens the portion of

the midrib by eating off the more surface of the leaf. After the third moult, it generally gnaws the stem of the leaf so that it hangs down and withers, curling in the process. The larva sits in the curl and wanders away to feed. The larvae vary in colour so as to match the different shades of withered leaves. The larva is sluggish, walking haltingly and resting with the head turned round on the side and with the face bowed. The pupation takes place on the underside of a leaf or twig and the attachment is firm and strong. Thus, the pupa hangs rigidly and it wriggles when touched.

Food-plants: English Lime or Linden, Mallows, Vetches. Trees of Various species of Leguminosae, Malvaceae and Oleaceae.

Distribution: India: Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Meghalaya, Peninsular India, Sikkim, West Bengal. Elsewhere: Sri Lanka, Myanmar.

Status: Common.

82. *Parthenos sylvia* (Cramer)

Papilio sylvia Cramer, 1775.

Parthenos sylvia (Cramer): Bingham,1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Clipper.

Diagnostic characters: Upperside green, greenish blue, golden green or moss green; fore wing a with discal series of large semitransparent white spots, hind wing veins black at disc, two black lines between veins and sometimes confluent in the middle, followed by a series of marginal black markings.

Morphological characters: **Male-** *Upperside* black olive green; fore wing with two broad black basal streaks, the upper one along both sides of the median vein sending a fine upward spur inside the cell, followed by a pair of oblique black lines in the cell and a white bar,

Parthenos sylvia gambrisius- Male (Upperside)

two triangular semihyaline white spots, a discal maculated band of 8-11 semihyaline white spots of varying shapes and sizes commencing from costa, just before apex, to to area 1, and ending there in a bluish diffused patch, a white spot in area 5 and 6 before the discal band, the edged outwardly by black, followed a submarginal and marginal wavy black band. Hind wing with a basal and subbasal black streak ending anteriorly in white spots, a discal series of black spots decreasing in size anteriorly, followed by a postdiscal series of elongate narrow streaks in pairs between the veins, streaks of each pair joined in or beyond the middle, a submarginal curved series of triangular black spots and finally a marginal broad black lunate band. *Underside* of both wings ochraceous yellow (much paler or lighter); fore wing with diffused pale bluish green with broad discal band and markings in the cell and beyond it almost like those on upperside, the two basal streaks of upperside being absent, the submarginal and marginal bands faint and ill defined. Hind wing basal pale bluish green and apical half white or ochraceous grey, the basal and subbasal streaks of upperside being absent, a discal highly sinuous and somewhat interrupted brown line; the postdiscal, submarginal and marginal black markings as those on uppeside but faint and ill defined. **Female**- mostly like that of male but paler and larger.

Parthenos sylvia gambrisius- Male (Underside)

Variation: The species exhibits variation in the size, number and colouration of markings on wings.

The following four subspecies are found in India.

i) *Parthenos sylvia gambrisius*- (95-110 mm). Upperside pale buish green; in DSF fore wing with apex whitish and white spots more contiguous. Assam (Cachar), Bangladesh, Myanmar.

ii) *Parthenos sylvia nila* Evans – Upperside of fore wing with postdiscal band confluent and not maculated, mid dorsum area to white band bright cyaneous blue, hind wing with discal area bright cyaneous blue. South Nicobars.

iii) *P. sylvia roepstorfi* Moore- (95-110 mm). Upperside moss green and fore wing with apex white. Underside paler. Andamans.

iv) *P. sylvia virens* Moore- (105-125 mm). Upperside greenish golden; fore wing with spot at end of cell as large a spot in area 3; hind wing with submarginal conical spots with their heads rouded. South India.

Wing expanse: Male, female 95-130 mm.

Habits: This species is one of the finest of all Nymphalids, especially in the greenish golden form from South India. It is magnificently powerful on the wing, flying gracefully after the manner of the species of butterflies of the geuns *Athyma*. It mainly keeps high among the trees, settling on prominent leaves with the wings outspread. Sometimes, it settles on flowers or wet patches in the sunshine. It is a pest on flowers.

Habitat and ecology: It is confined to thick jungle regions with the heavy rainfall. It is commonly found between elevations of 305 and 915m during September-February on Western Ghats.

Life history: The larva is green with yellow lateral stripe and reddish or blackish spines; head brown Pupa is brown with smooth surface. It takes three days to develop into a imago.

The larva of *virens* is cylindrical. It is pale green, with yellowish-white lateral stripes one on each side. The pupa is brown and boat-shaped.

Food-plants: *Adenia* sp. (Passion flower), *Tinospora cordifolia.*

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Manipur, Sikkim, South India. Elsewhere: Bangladesh, Myanmar.

Status: Not rare. This species is protected under Schedule-II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

83. *Apatura ambica* Kollar

Apatura ambica Kollar, 1844.

Apatura ambica Kollar: Bingham, 1905; Evans, 1932; Wynter Blyth, 1957; Varshney, 1994.

Common name: Indian Purple Emperor.

Diagnostic characters: Upperside brownish black, a broad and white discal band bordered with shining iridescent blue across fore- and hind wing, fore wing with a short oblique white band above discal band and three preapical white spots. Upperside of female paler and with yellowish white markings larger.

Morphological characters: **Male-**: *Upperside* of wings brownish black; fore wing, with an inwardly oblique broad white discal band from vein 3 to inner margin, the discal band bordered on both sides by bright iridescent blue, four white spots with the anterior most one smallest forming an oblique maculated band above the discal band, three preapical white spots with the lower most spot in area 4 being smallest, followed by a series of submarginal faint white spots and two similar white marginal white spots in area 1, outer margin emarginate between veins 2 and 5. Hind wing with a white oblique discal band, as if continued from fore wing, from costa to a little beyond vein 2, followed by a slightly curved series of submarginal white spots and an obscure series of marginal white spots, both the submarginal and marginal series

Apatura ambica ambica- Female (Upperside)

ending above an orange tornal spot. *Underside* of both wings silvery bluish white. Fore wing with two black spots forming a short bar in the middle of cell, a similar bar at end of cell, and another bar beyond cell, discal band and spots of the upperside showing through pinkish white, an oblique and sinuous rich brown postdiscal band ending at a large black tornal area, the latter with a orange yellow patch enclosing a black spot, the marginal rich brown band ending above the black tornal spot, the marginal band bearing white spots from vein 4 and continued on black tornus, additional three white spots at the black tornal area inner to the marginal white spots. Hind wing with discal band of the upperside showing through pinkish white, a straight and oblique postdiscal rich brown band from costa to tornus, a similarly coloured marginal band meeting anteriorly and posteriorly with postdiscal band, a black white bordered subtornal spot and another such spot in area 2 on the postdiscal band. **Female-** like that of male but *upperside* dusky brown and yellowish white markings larger.

Apatura ambica ambica- Female (Underside)

Variation: The species shows variation in colouration, size and width of discal band as well as other markings on wings. It has seasonal variations.

The following two subspecies occur in India.

i) *A. ambica ambica* Kollar- Smaller. All markings more sharply defined. It varies much and sometimes giving rise to abberations. Kashmir. Myanmar (Dawnas).

ii) *A. ambica chitralensis* Evans- Very large. Upperside blue gloss duller with white markings broad and diffused, fore wing with discal band reaching vein 11, and hind wing with submarginal white markings very large. Underside of hind wing without ocellus in area 2. Kashmir. Pakistan.

Wing expanse: Male, female 65-90 mm.

Habits: This butterfly is a very fast flier and basking high. Both sexes settle on damp sand with their wings spread. It is fond of carrion, dung, etc. The male is considered as one of the most beautiful butterflies of India. It is a pest on vegetables.

Habitat and ecology: It is found flying near streams and settling in middle of rocks. It ascends from low or moderate elevations to about 2450m. It has two broods, one during April-May and another after the rains.

Life history: The larva is dark green, with dorsal edge, the head with short horns, the abdomen ending in a sharp red-brown point; the anterior three segments with lateral tufts of hair. The pupa is pale green, covered with whitish down.

Food-plants: *Celtis tetrandra, Ulmus wallichiana* (Urticaceae).

Distribution: India: Assam, Himachal Pradesh, Jammu & Kashmir, Nagaland, Sikkim, Uttarakhand, West Bengal. Elsewhere: Pakistan, Myanmar.

Status: Locally not rare.

SUBFAMILY CHARAXINAE

Large and robust butterflies. Fore wing with cell closed, vein R4 arising nearer to end of cell than to termen. Hind wing with the cell open or closed.

84. *Polyura athamas* (Drury)

Papilio athamas Drury, 1770.
Eulepis athamas (Drury): Bingham, 1905.
Eriboea athamas (Drury): Evans, 1932; Wynter Blyth, 1957.
Polyura athamas (Drury): Smiles, 1982; Varshney, 1994.

Common name: Common Nawab.

Diagnostic characters: Upperside of both wings black, with a broad discal pale yellow or greenish yellow band of varying width; fore wing with white spots in areas 5 and 6; hind wing with a submarginal series of small white spots and tailes at veins 2 and 4.

Morphological characters: **Male-** *Upperside* of wings dark brown, with a broad pale yellow or greenish yellow discal band across both wings; fore wing with the discal band bounded anteriorly by the vein 4 and not entering the cell, the width of discal band nearly uniform from area 3 to inner margin, a moderately large and quadrate white spot in area 5, another minute white preapical dot in area 6. Hind wing with the discal band continued as from fore wing, narrowed to an acute point alittle below the vein 2, postdiscal short whitish streaks below the acute point of discal band to the inner margin, a submarginal series of white spots and beyond the latter two or three small white spots with greenish/pale

Polyura athamas athamas- Male (Upperside)

Polyura athamas athamas- Male (Underside)

yellow, prominent tailes present at veins 2 and 4. *Underside* of wings olive brown; fore wing bearing a spot in areas 5 and 6 and discal band as on upperside but these markings paler and broader, at base and costal margin to apex and then broadly to tornus lilacine brown; discal band margined on inner side with black lines followed by a broad chocolate coloured curved band continuing narrowly along the outer side of the discal band, beyond it lies a curved series of blackish lunules and a whitish line. Hind wing with base and inner margin broadly lilacine brown, discal band bordered on inner side with black line, the latter below vein 2 turning inwardly to dorsum, the discal band outwardly traversed by a line of obscure pale lunules, a submarginal series of white lunules margined outwardly by black spots, finally an obscure ochraceous marginal line. **Female-** mostly like that of male but paler.

Variation: This species shows variation in the width of discal band in both wings, and number and prominence of subapical spots on fore wing. It also exhibits much seasonal variation which renders identification a hill-task.

The following three subspecies occur in India.

i) P. athamas agrarias Swinhoe- Larger. Upperside of fore wing usually with two pale subapical spots. South India.

ii) P. athamas athamas (Drury)- Large and very variable. Kulu. North Myanmar.

iii) *P. athamas andamanicus* Fruhstorfer- Much larger and very dark. Andamans.

Wing expanse: Male, female 60-75 mm.

Habits: The butterfly basks on tree-tops, flies fast around them and settles on sap, manure and damp patches. It also flies low along paths, in forest glades and settles on leaves low down. The males are more common than the females. It is a pest on fruits.

Habitat and ecology: It is found in jungle and forested regions throughout the Peninsula but may also be found in open areas, especially in the Himalaya. It is found up to elevations of 1400m in South India and from elevations of 2750m in the Himalaya.

Life history: The egg is semiglobular and yellow and may be smooth. The dark green larva is elongated and slug-shaped. It is very shy and feeds only at night and lying motionless during day-time. The pupa is thick and cylindrically oval. It is green with with delicate lines/streaked with white.

Food-plants: *Acacia caesia* (Aila), *A. catechu* (Khai,Cutch), *A. chundra* (Lal Khair), *A. pennata* (Aila), *A. suma* (Sai Kanta), *Adenanthera pavonina, Albizia lebbeck* (Siris), *A. julibrissin, A. stipulata* (Chakua, Sirin), *Archidendron molle, Caesalpinia crista, C. ruga, C. sappan, Falcataria moluccana, Grewia* sp., *Pelonix regia* (Gold Mohur, Gul Mohr), *Pithecellobium* sp., *Sesamum indicum* (Til).

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Himachal Pradesh, Kanataka, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Nagaland, North-west Himalaya, Orissa, Peninsular India, Sikkim, Uttar Pradesh, West Bengal,. Elsewhere: Bangladesh, China (Hainan), Hongkong, Laos, Myanmar, Singhapore, Sri Lanka, Taiwan, Thailand, Vietnam and West Malaysia.

Status: Not rare. Locally common. The subspecies, *P. athamus andamanicus* Fruhstorfer is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY LIBYTHEINAE

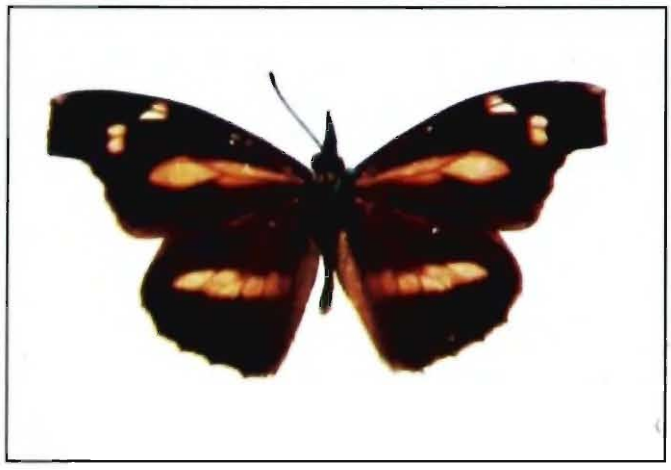
Eyes naked; labial palpi very long, porrect and beak like; wings short and broad; cells of both the wings closed by tubular veins, fore wing falcate and truncate at apex and vein 1b forked at base; fore legs imperfect in male but functionally perfect in female.

85. *Libythea myrrha* Godart, 1819

Libythea myrrha Godart, 1819.
Libythea myrrha Godart: Bingham, 1905; Evans, 1932; Varshney, 1994.

Common name: Club Beak.

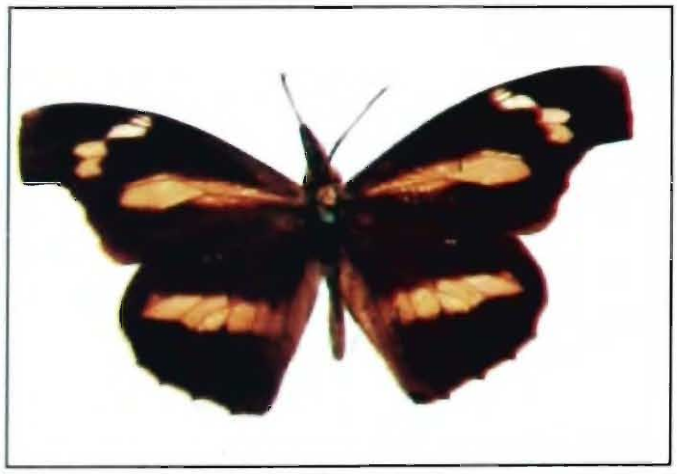
Diagnostic characters: Head with a prominent beak.Upperside of wings dark brown; fore wing produced and angular, yellow club shaped streak from base to beyond cell, and an apical band; hind wing with a broad yellow band.



Libythea myrrha carma- Male (Upperside)

Morphological characters:

Male- *Upperside* of both wings dark brown; fore wing without dark yellow spot in area 1b; with a tawny club shaped streak from base of wing extending beyond the cell to near the outer margin, two preapical double white or tawny spots separated or forming a band, a small white spot at extreme apex may be present. Hind wing with a slightly oblique discal band from vein 1 to vein 5, wide and diffused towards inner margin but narrowed towards and not reaching apex. *Underside* much paler; fore wing with tawny markings as on upperside but broader and diffused, apex and dorsal margin broadly shaded with pale grey irrorated with minute dark spots and transverse short striae. Hind wing greyish brown irrorated with minute dark spots and transverse short striae, and shaded in the cell, on the middle of the costal margin, and on the middle of the termen with diffuse brown. **Female**- like that of male but paler and tawny markings larger.



Libythea myrrha sanguinalis- Male (Upperside)

Variation: This species varies in width of bands the size of the spots.

There are two subspecies in India.

i) *Libythea myrrha carma* Fruhstorfer- Upperside of wings with

ochreous markings slightly wider, fore wing usually with two apical spots white and two lower ones ochreous. South India.

ii) *Libythea myrrha sanguinalis* Fruhstorfer- Upperside of wings with ochreous markings wide, fore wing with all apical spots yellow, hind wing with band reaching inner margin. Kulu. Myanmar.

Wing expanse: Male, female 45-55 mm.

Habits: The flight of this butterfly is very quick. It visits damp patches and flowers. It basks early in the morning. It is wary and easily frightened. When disturbed, it flies off rapidly for a short distance, then either returning soon or settling at the end of a twig and there resembling a leaf.

Habitat and ecology: It is very common around streams in forests. In the North-western Himalaya its range is about 900- 2750m from April to autumn, but in the Himalaya, it flies up to 1550m. In the south it inhabits the evergreen regions and is occasionally found above those regions.

Life history: The eggs are laid on the young leaves or shoots of a tree or shrub near a stream, or in a damp, sunny place in forest. The caterpillar lives on the underside of a leaf and eats all the leaf except the ribs and veins, along which it lies. When violently disturbed, it falls to the ground on a thread of silk. It rests with the true legs off the surface in the air, bunched together, the head curved down and often to one side. The pupa is formed on the underside of a leaf and the body lies quite parallel to the surface. The pupa is with a flat square head. It is light green with the tops of all the carinations yellow, with a black speck on the abdominal peak. Its surface is smooth and somewhat shiny.

Food-plants: *Celtis australis* (Khark, Khirk), *Celtis tetrandra.*

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Meghalaya, Sikkim, South India. Elsewhere: Myanmar, Sri Lanka.

Status: Common in North India but not rare in South India.

FAMILY LYCAENIDAE

The fore legs are reduced compared to the other legs, but in the female the fore tarsus is five segmented and clawed and fully functional. Normally in the male the fore tarsus is reduced to a single segment; in Riodininae it is brush-like, as in Nymphalinae, and the leg is too small to be used for walking; in other subfamilies the leg is larger and used for walking. In a few species the fore tarsus is five segmented and clawed, as in the female.

The face is narrow and the eyes, consequently close together, are contiguous with the antennae. The periphery of the eye eyes is emarginated to accommodate the antennal scape, but the emargination may be very slight in Riodininae e.g., *Dodona* Hewitson.

SUBFAMILY RIODININAE

The adults are rather small and delicate butterflies which fly only in sunshine, all confined to primary forest. Fond of settling on upperside of leaves, with half-open wings and are usually found singly.

The forelegs (resemble Libytheinae) are non-functional in but functional in the female. The eyes naked or hairy. Palpi porrect, and usually small and slender. Fore wing with vein 1b rather weakly bifurcate at the base. Hind wing with a precostal vein. The hind wing may be produced at the tornus, or lobed, or dentate or angled at vein 2, 3 or 4. Cells of both wings closed by tubular veins. The antennae usually longer than half the fore wing costa, and the club is spatulate, broadens rather gradually. Secondary sexual characters present on the wings of males only in *Paralaxita*.

Usually the larva is onisciform, broadest in the middle, tapering at each end, and is clothed with short hairs; usually it is recumbent, and attached to a leaf at the anal end and by a median girdle, but in some species it is anally suspended.

86. *Dodona durga* (Kollar)

Melitaea durga Kollar, 1844.

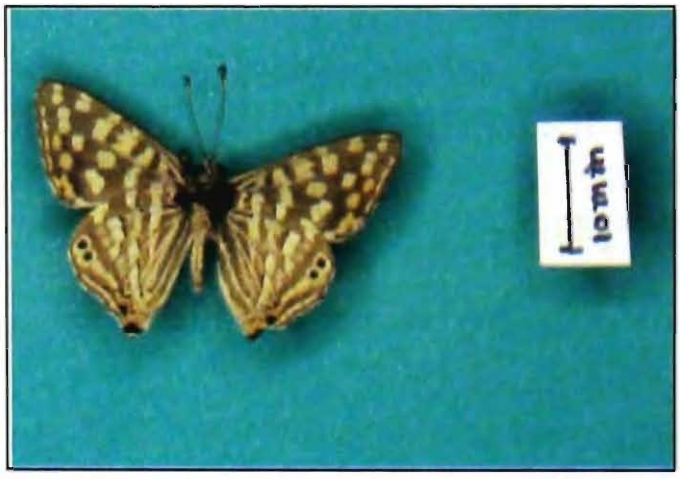
Dodona durga (Kollar): Bingham, 1905; Evans, 1932; Wynter-Blyth, 1957; Varshney, 1993.

Common name: Common Punch.

Diagnostic characters: Male, female: Upperside of fore- and hind wings dark brown bearing numerous prominent dark yellow spots.

Dodona durga- Male (Upperside)

Morphological characters: **Male-** *Upperside* of wings dark brown with numerous prominent dark yellow spots; fore wing with three dark yellow bars- one each in the cell, at the end of cell also beyond the cell; hind wing with a tornal lobe but without tail. *Underside* of wings with large pale yellow spots; hind wing with two small black spots near the apex. **Female**: like male but larger, wings broader and ground colour slightly paler with markings whiter and broader, outer margin of fore wing more convex and apex less produced.



Dodona durga- Male (Underside)

Variation: The species shows variation in the size and shape of the wing markings.

Wing expanse: Male, female 30-42 mm.

Habits: The butterfly flies in the sunshine near streams or water. Its flight is very quick but the butterfly settles frequently, on sand at water, on roads or on leaves at the sides of the paths. It attacks any other butterfly approaching it and not allowing others in its vicinity. The males freely visit damp patches and flowers than the females.

Habitat and ecology: It commonly occurs over the outer ranges of the Himalaya from spring to autumn. It flies between elevations of 760- 2440m on pastures and grassy slopes.

Life history: The larva is emerald green with blue dorsal lines and its head is brown. Pupa is naked, with. head bearing two obtuse protuberances and tail end pointed. Its pupa resembles that of *Zemeros flegyas*, though the casing is somewhat higher and anal point further protracted.

Food-plants: *Arundinaria* (Hill bamboo), Grasses and *Maesa*.

Distribution: India: Jammu and Kashmir, Uttarakhand. Elsewhere: Nepal, Pakistan.

Status: Very common.

SUBFAMILY PORITIININAE

They are small or moderate species. Antennal club gradual and cylindrical; nudum extending down shaft. Eyes smooth (except in some species of *Deramas*). Palpi smooth. Fore wing with 10, 11 or 12 veins, and vein 11 anastomosed with vein 12 for most of its length. Hind wing without tails or tornal lobe, and usually with indications of a precostal vein.

All show sexual dimorphism. Upperside of males brilliantly coloured green or blue, while females variously coloured, and usually black borders present. Underside pattern is very characteristic of closely set fasciae (e.g., *Poritia* Moore); secondary sexual characters present in males (except in *Deramas* Distant).

Early stages imperfectly known. Egg hexagonal, larvae very hairy and lack honey glands and extrusible tubercles. The pupae, attached only by cremaster, retain the larval skin bunched up round the point of attachment.

87. *Poritia hewitsoni hewitsoni* Moore

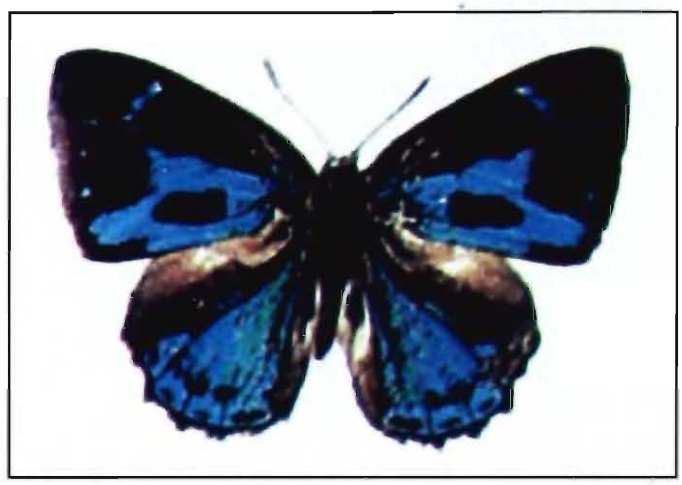
Poritia hewitsoni Moore, 1865.

Poritia hewitsoni Moore: De Niceville, 1890; Bingham, 1907; Wynter-Blyth, 1957, Varshney, 1997.

Poritia hewitsoni hewitsoni Moore: Evans, 1932; Cantlie, 1962.

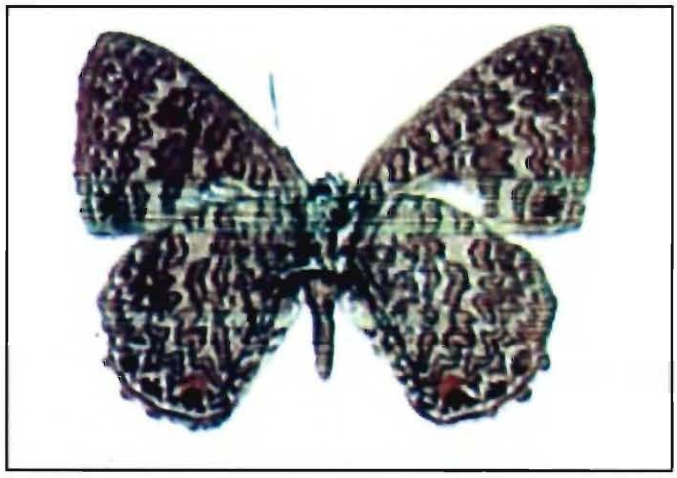
Common name: Common Gem.

Diagnostic characters: Underside with numerous catenulated bands of annular rings. Female upperside with blue colouration less extensive than black and a yellow discal patch above blue area.



Poritia hewitsoni hewitsoni- Male (Upperside) after D'Abrera, 1986

Morphological characters: **Male-** *upperside* dark blue; fore wing with cell not entirely black, always a black streak along the outer three-fourths of the Cubitus (median in Evans), upper edge of streak being strongly convex and reaching the radius so that small blue patches remain at apex and base of cell, this streak even when reduced reaches more tthan half way acrooss the cell; hind wing having cell and area 4 blue with a narrow black bar at end cell, a brand above vein 7 covered by a tuft. *Underside* brown with pale lines. **Female-** like male but *upperside* of fore wing with a yellow discal patch in area 4 and hind wing black with more or less violet blue band on disc.



Poritia hewitsoni hewitsoni- Male (Underside) after D'Abrera, 1986

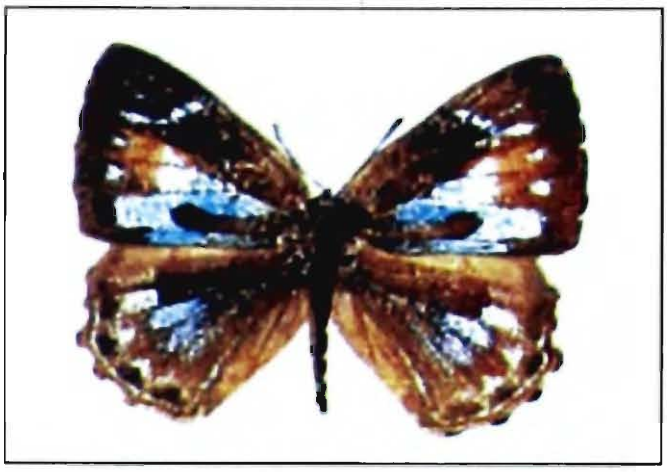
Variation: Only the nominate subspecies occurring in India is highly variable both in ground colour and markings on underside. The upperside of fore wing, in male, may have a minute basal spot.

Wing expanse : Male, female 31-38 mm.

Habits: The males fly rapidly around the trees and settle on leaves. In male, tuft on hind wing produces a perceptible pleasant odour.

Habitat and ecology : It is found in jungle country at low elevations. It occurs during October-November in Sikkim

Life history: The egg is a truncate pyramid, half again as long as wide with two vertical, two sloping and two horizontal faces, and reticular above.



Poritia hewitsoni hewitsoni- Female (Upperside) after D'Abrera, 1986

Distribution: India: Assam, Sikkim, Uttarakhand. *Elsewhere:* Bangladesh, Nepal.

Status: Not rare. This nominate subspecies is included under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

SUBFAMILY MILETINAE

The wings are dull-coloured, usually some shade of brown or white, and lacking structural scales giving bright colours; and fore wing with 11 or12 veins. A terminal pair of spurs absent on the mid- and hind-tibiae; the male fore tarsus may be reduced to single segment, or five segmented and clawed. Male abdomen may be of normal size or very long extending beyond the hind wing tornus.

The larvae are aphytophagous, either carnivorous or feeding on the secretions of Homoptera.

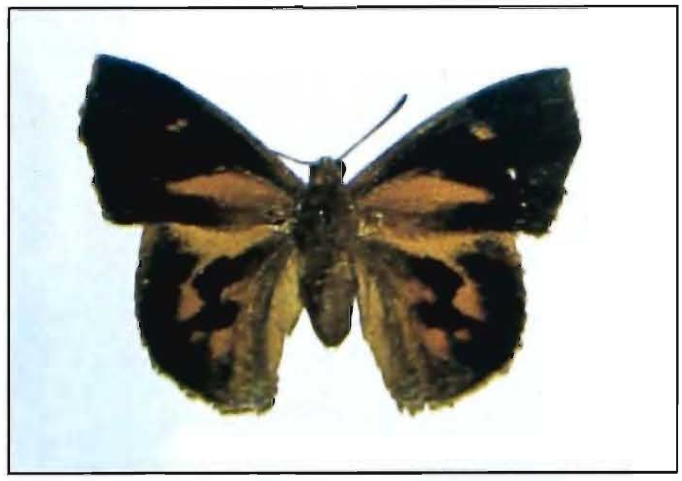
88. *Liphyra brassolis* Westwood, 1864

Liphyra brassolis Westwood, 1864.
Liphyra brassolis Westwood: Varshney, 1997.

Common name: Moth Butterfly.

Diagnostic characters: Very large with stout and short body. Skipper or moth-like appearance and wings coarsely scaled.

Morphological characters: **Male-** *Upperside* yellowish brown with irregular black borders; fore wing with a large black spot at end of cell, extending into bases of areas 2 and 3; hind wing with black spot at end of cell, largee spots in areas 2 and 3. Underside dull yellow and marked rather as upperside.



Liphyra brassolis- Male (Upperside) after D'Abrera, 1986

Female- like male but *upperside* reddish ochreous yellow; fore wing border broad blackish brown extenidng to mid proximal margin; hind wing with border broad blackish brown extending to the anl angle. *Underside* ground colour paler.

Variation: The species shows variation in black colouration. In both sexes, the whole hind wing may have mottlings of brown along the costal margin.

Liphyra brassolis- Male (Underside) after D'Abrera, 1986

Wing expanse: Male, female 86-92 mm.

Habits: This is the largest butterfly among all the lycaenids. It flies around slowly with a humming sound, circling uncertainly for a long time before settling. It has also been found as crepuscular and having a very Skipper-like flight. This is an ugly butterfly, exhibiting symbiosis with ants.

Habitat and ecology: The female is found on warm sunny days visiting a tree, *Nauclea orientalis*, which has several large nests of green tree ants of *Oecophylla smaragdina*.

Life history: The eggs are laid on underside of branches of tree trunk of *Nauclea orientalis*. The larva appears in 22days and it is oval

and flat. In size and shape, the half grown larva is medium size lozenge with a raised rim along the dorsal surface. It is pale yellowish brown having seven dark spots on each side near the margin. Across the centre of the dorsal surface there are three furrows which are constant through all the moults. The larva feeds on the ant larvae. It is covered by a tough skin protecting it from the attacks of ant larvae. The larval skin is retained throughout pupation, which also takes place in the ants' nest. The pupation lasts for 21-25days.

Liphyra brassolis- Female (Upperside) after D'Abrera, 1986

Liphyra brassolis- Female (Underside) after D'Abrera, 1986

Food plants / Ant association: *Nauclea orientalis.*

Ant: Nests of *Oecophylla smaragdina* (Tree ant larvae) on a tree of *Nauclea orientalis.*

Distribution: India: Assam, Sikkim. Elsewhere: Myanmar.

Status : Endangered (Gupta & Mondal, 2005). This species is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

89. *Spalgis epeus* (Westwood)

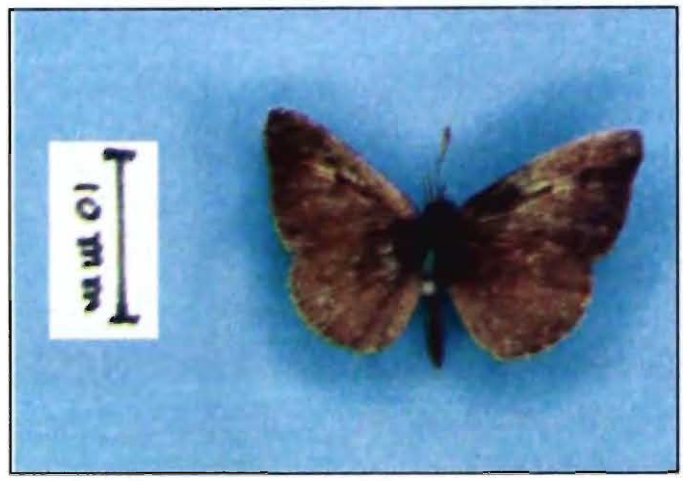
Lupius epius Westwood, 1851.

Spalgis epius (Westwood): Bingham, 1907; Evans,1932; Wynter-Blyth, 1957;

Spalgis epeus (Westwood): Cantlie; 1962; Bridges, 1994; Varshney, 1997.

Common name: Apefly.

Diagnostic characters: Upperside brown and fore wing with diffused or well-defined discal white patch.

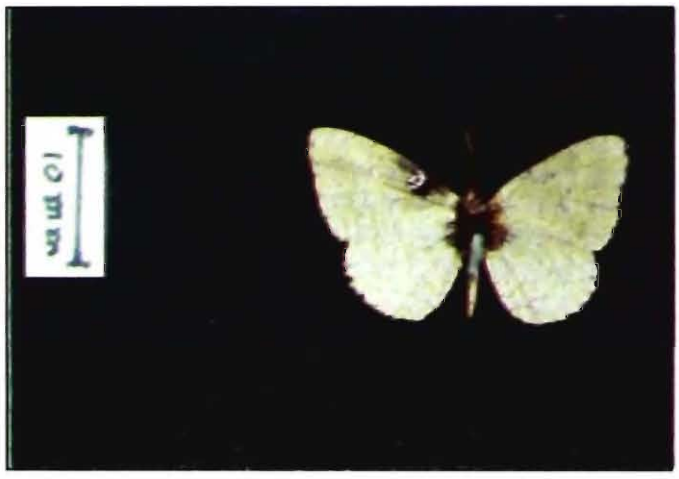


Spalgis epeus epeus- Male (Upperside)

Morphological characters: **Male-** *Upperside* brown; fore wing with diffused or well-defined discal white patch at end of cell, apex acute and termen straight. *Underside* uniformly brownish white with a number of very slender equidistant irregular undulating brown lines. **Female-** both apex and termen of fore wing rounded.

Variation: The discal white patch shows considerable variation in size.

The following two subspecies occur in India.



Spalgis epeus epeus- Male (Underside)

i) *Spalgis epeus epeus* (Westwood)- Paler on upperside as well as underside and white discal patch always present on upperside of fore wing. Kumaon, Sikkim, West Bengal, South India, Nepal, Sri Lanka.

ii) *Spalgis epeus nubilus* Moore - The upperside is darker. In fore wing the white patch is almost obsolete. Andamans and Nicobars.

Wing expanse: Male, female 20-30 mm.

Habits: The butterfly is fast and erratic in flight, keeping low down among bushes, especially near its food stuff is to be found and in among leaves and branches. Its larva is carnivorous, feeding upon mealy Bugs (Coccidae) or Scale insects that affix themselves to the leaves or stem of plants and live on their juices.

Habitat and ecology: It prefers thick country and the hills below 1200m but it may also be found on the plains and in regions of both heavy and moderately light rainfall and also along the lower slopes of the Himalaya from Kumaon to Sikkim.

Life history: This butterfly lays eggs among the Scale insects or may be an aphid, *Dactylopius adonideum* (these insects affix themselves to the leaves or stem of plants and live on their juices.). The egg above is flattened and its surface bears fine hexagonal reticular markings. The little larva, on hatching out, burrows into one and completely devours it except for the outer skin. It then proceeds to eat another Scale insect. The grown up larva becomes entirely obscured by a covering of dried skins and the cottony fluff of the creatures upon which it feeds. The covering is left behind when it pupates. It is from the resemblance of the pupa/chrysalis to a monkey's head that the butterfly gets its name.

Food-plants/insects: Carnivorous on Coccidae (Scale insects or Mealy bugs), aphid-*Dactylopius sp.*which affix themselves to leaves of plants of Euphorbiaceae.

Distribution: India: Andaman and Nicobar Islands, Assam, Karnataka, Maharashtra, Orissa, Sikkim, South India, Uttarakhand, West Bengal. Elsewhere: Bhutan, Myanmar, Nepal, Sri Lanka.

Status: Not rare.

SUBFAMILY CURETINAE

Fore wing with 11veins; veins 11 and 12 free; vein 7 ending on termen just below the apex. Hind wing tailless. Eyes hairy. Palpi clothed with appressed scales.Antenna with cylindrical club and nudum extending almost to the base of the shaft; sense organ (made up of sparse fringe of bristles) present on underside of 3-4 basal shaft segments. Proboscis bearing prominent sensory hairs. Male fore tarsus fused to single segment ending in atapered down-curved point. Tibial spurs inconspicuous in some species. The secondary sexual characters consisting of a pair of erectile hair pencils arising from the tergum of abdominal segment 2 and normally housed beneath a flap on the sternum of segment 3 above presumed glandular area.

Egg is a flattened sphere with coarse hexagonal reticulations. Larva with apair of long permanently exserted cylinders furnished with extrusible tentacles, but no honey-gland. Pupa almost hemispherical, with a completely flat under surface, attached by the cremasterand usually by a weak girdle.

90. *Curetis dentata dentata* Moore

Curetis dentata Moore, 1879.

Curetis dentata Moore: De Niceville, 1890; Wynter-Blyth, 1957; Varshney, 1997.

Curetis bulis ? var. dentata Moore: Bingham, 1907.

Curetis dentata dentata Moore: Cantlie, 1962.

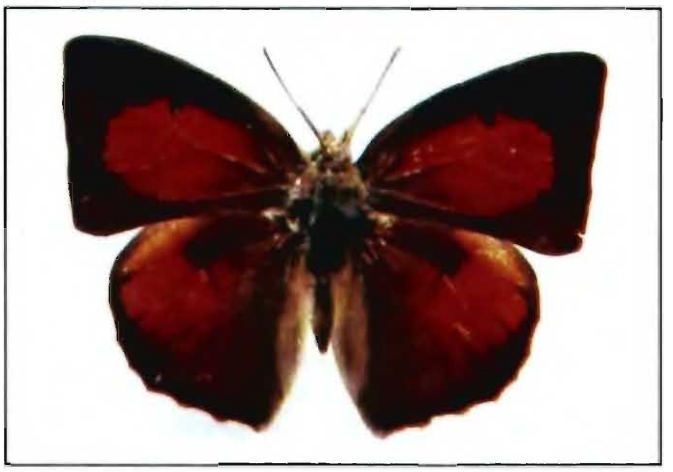
Common name: Toothed Sunbeam.

Diagnostic characters: Upperside of hind wing with discal band in areas 6 and 7 close to end of cell, female with much larger white discal areas.

Morphological characters: **Male-** Fore wing slightly concave but scalloped out exterior margin; *upperside* with red patch very broad extending over the base of area 5, a dentate black mark given off from costal border and covering the end of cell and its outer margin sinuous; hind wing convex and slightly sinuous on its exterior margin, with the red broadly diffused, outer border narrow, basal streak and abdominal border dusky black. *Underside* of hind wing with discal band in areas 6 and 7 close to end of cell than other bands in areas 2 to 5. **Female-** Like male but *upperside* with fuliginous-brown borders, white discal patch extending over the base of the area 5; fore wing with the dentate mark distinct.

Variation: Only the nominate subspecies occurring in India is very variable. There are minor variations in wing shape and extent of red and white areas according to the season. The discal areas are reduced in wet season form (WSF).

Wing expanse: Male, female 46-49 mm.

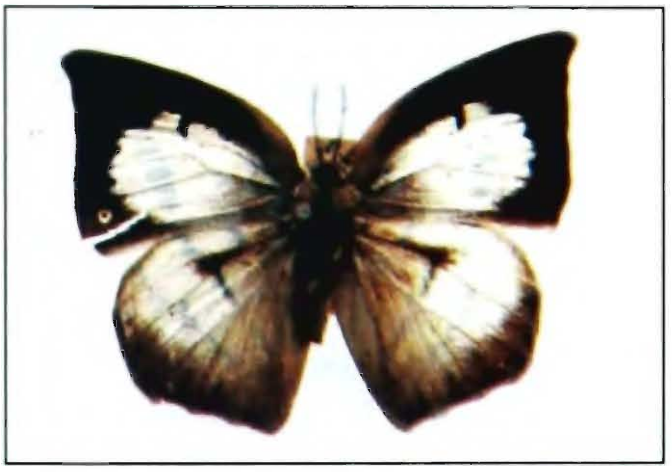


Curetis dentata dentata - Male (Upperside)

Habits: The butterfly is a powerful flier. The male often takes advantageous position on some prominent leaf of a high tree and pursues any butterfly that passes by or flies to and fro. It basks in the sunshine, the male high up in the trees and the female less often and lower down. The male is found near water but the female is mostly found sitting on the underside of a leaf in the jungle.

Habitat and ecology: It is found in scrub and jungle country at low elevations but also sparingly to 2100m.

Life history: In the allied species, *Curetis bulis*, eggs are hemispherical (Haribal,1992). The egg of *C. thetis* is decorated with spines and is pale bluish in colour. The larva has protective pillars on 12th segment. The pupae are of unusual hemispherical shape.



Curetis dentata dentata- Female (Upperside)

Food plants: *Abrus precatorius* (Indian Liquorice, Rati, Gunchi, Kunch), *Derris scandens* (Gonj, Noalata), *Pongamia pinnata, Trichilia connaroides, Xyliaxylocarpa.*

Distribution: India: Arunachal Pradesh, Assam, Himachal Pradesh, Madhya Pradesh, Sikhim, Southern India, Uttarakhand, West Bengal. Elsewhere: Myanmar, Nepal.

Status : Not rare.

SUBFAMILY LYCAENINAE

Antennal club may be cylindrical (except in *Chliaria* with 10 veins in fore wing) or more or less hollowed or flattened beneath (except in some females of *Niphanda*). Males use the foreleg for walking. Fore wing with 10 or 11 veins. Hind wing may be with one or more filamentous tails at veins 1b, 2, 3 or 4 or without any tail. Underside of wings with or without metallic silvery markings.

The larvae of many species have dorsal gland (Newcomer's gland) on the 7th abdominal segment which secrets "honey dew" attractive to ants. In addition, paired eversible tubercles bearing tentacles may be present on the 8th segment.

71. *Acytolepis puspa* (Horsfield)

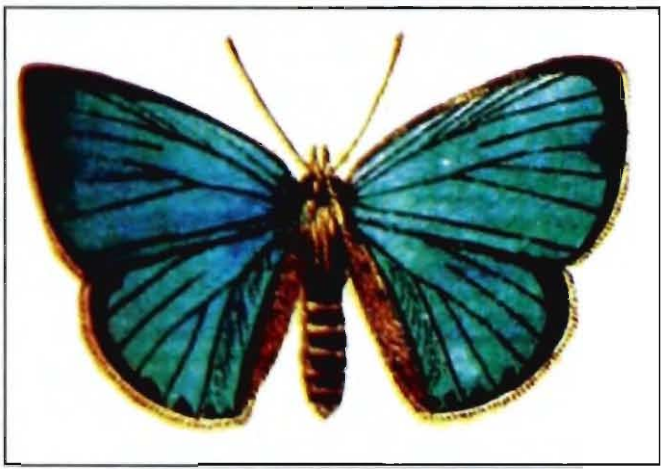
Polyommatus puspa Horsfield, 1828.
Cyaniris puspa (Horsfield), Bingham, 1907.
Lycaenopsis puspa (Horsfield): Evans, 1932, Wynter-Blyth, 1957.
Celastrina puspa (Horsfield): Cantlie, 1962.
Acytolepis puspa (Horsefield): Eliot & Kawazoe, 1983; Varshney, 1997.

Common name: Common Hedge Blue.

Diagnostic characters: Medium size. Upperside of fore- and hind wings voilet-blue with broad black borders, usually a white patch at middle of each wing; female with blue confined to bases, white patches larger and black borders broader. Underside of fore wing with an outer discal spot in area 1b and hind wing with a spot at extreme base in area 7.

Morphological characters: **Male-** *Upperside* of wings iridescent violet-blue with black margins; fore wing costa 1 to 2mm blackened, discal white patches may or may not present. *Underside* of wings with markings coarse; fore wing with a discal spot oblique in area 2 and directed to spot at end of cell, spot in area 3 vertical and directed to centre of spot in area 4, spots in areas 2 and 5 with their inner edges irregular, sometimes an additional costal spot over spot in area 6;

hind wing without a spot near base of area 1b or if present then also a spot present at base of cell, often a basal spot in area 2, a discal oblique and elongate spot in area 4 and a basal spot in area 7. **Female**- like male but wings having iridescent blue at bases, larger white patches on disc and broader black margins.



Acytolepis puspa cyanescens- Male (Upperside) after Swinhoe, 1905-1910

Variation: The species exhibits variation in the extent of violet-blue colouration, size of white patches, width of wing borders, presence or absence of some spots, and also seasonal variation.

The following four subspecies are found in India.

i) *A. puspa felderi* Toxopeus- In male, fore wing border is about 1.0 mm at tornus to 3.5 mm at apex. Dry season form (*dsf*) and wet season form (*wsf*) are only slight. Maharashtra (Bombay), SouthIndia. SriLanka.

ii) *A. puspa gisca* (Fruhstorfer)- In male, fore wing border is about 1.5 mm at tornus to 5.0 mm at apex. Dry season form and wet season form are well marked. In both sexes, discal white patches are broader in DSF and underside markings are coarse but discal white patches are narrow in WSF. Andaman Islands, northern India; Assam, Bihar (South Bihar), Himachal Pradesh (Shimla), Sikkim. Bangladesh, Cambodia, Hong Kong, Laos, Nepal, North-east Afghanistan, Myanmar, Pakistan, South China (Guangdong (Kwantung), Hainan, Yunnan), Thailand,Vietnam.

iii) *A. puspa cynascens* (De Niceville)- Underside of wings with all the markings are small; on fore wing a post-discal spot in area 9 and on hind wing the basal spot in area 7 and subbasal spot in area 1b are usually absent. Car Nicobar and Central Nicobar Island.

iv) *A. puspa prominens* (De Niceville)- In female, fore wing border is narrow, about 1.5 mm from tornus to vein M3; rich blue without whitish areas South Nicobar Islands.

Wing expanse: Male, female 28-35 mm.

Habits: This is a very beautiful butterfly and is found in clearings, along roads, or on hill tops, flying around bushes or the lower leaves of trees. The males are abundant at wet sand or on damp roads in the hot weather. It is a pest on plants.

Habitat and ecology: The butterfly is of low elevations, occurring in the Himalayan foothills, and in wooded parts of the Peninsula south of Bombay. It flies to elevations of 2450-3050m. In northern India it is found during July–October, in eastern Himalaya its season is from spring to autumn and in rest of its range it is found throughout the year.

Life history: The eggs are deposited singly on a leguminous plant, in the axillae of the stalksand the bracteae of the small flower-heads, when still buds. They are disc shaped and greenish white in colour. The larva is woodlouse-like in shape and of plum-pink colour. The ants also attend to it casually.

Food-plants: *Cycas circinalis* (Jangli madan-mast-ka-phul), *Cycas rumphii, Hiptage benghalensis* (Madhavilata, Madhub lata), *Litchi chinensis* (Litchi), *Paracalyx scariosus, Schleichera oleosa* (Lac tree, Macassar Oil tree), *Xylia xylocarpa.*

Distribution: India: Andaman & Nicobar Islands, Assam, Bihar, Himachal Pradesh, Maharashtra, Sikkim, South India. Elsewhere: Afghanistan, Bangladesh, Cambodia, Hong Kong, Laos, Myanmar, Nepal, Pakistan, South China (Guangdong), (Kwantung, Hainan, Yunnan), Sri Lanka. Thailand, Vietnam.

Status: Common. One of its subspecies, *C. puspa prominens* (De Niceville) is critically endangered (Gupta and Mondal, 2005) and is protected under Schedule I (Part-IV) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

92. *Catochrysops strabo* (Fabricius)

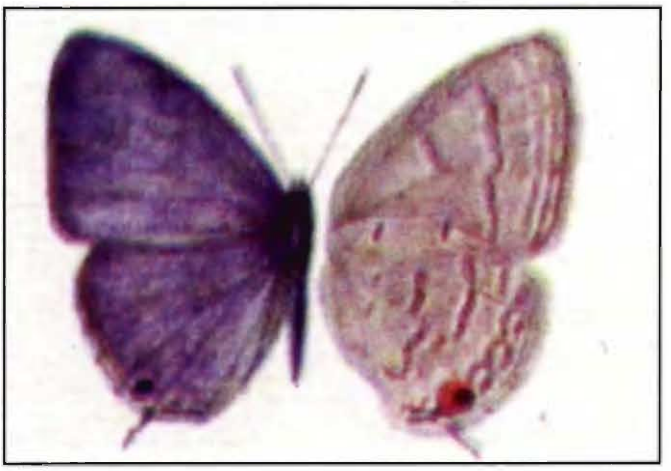
Hesperia strabo Fabricius, 1773.

Catochrysops strabo (Fabricius): De Niceville, 1890; Bingham, 1907; Evans, 1932; Wynter-Blyth, 1957; Cantlie, 1962; Vasrshney, 1997.

Common name: Forget-Me-Not.

Diagnostic characters: Male paler brighter voilet blue and tailed. Female brown with bases and central parts of discs blue; and a very large orange crowned tornal spot and a tail on hind wing.

Morphological characters: **Male-** *upperside* pale violet-blue with thread like dark border; hind wing with a prominent tornal spot. *Underside* bands narrow and more catenulated; fore wing with a spot on costa mid-way between the spot at end of cell and the discal band; hind wing with two small costal spots and a very large orange crowned tornal spot. **Female-** Like male but *upperside* brown, base and disc overlaid with metallic blue; hind wing having only one prominent tornal spot.



Catochrysops strabo- Male (Upperside & Underside) after Bingham, 1907

Variation: The species is very variable and three subspecies are found in India.

i) *C. strabo asoka* (Fabricius)- Wing expanse 32-36 mm. Upperside more violaceous blue and apex of fore wing more obtuse. Himachal Pradesh (Mandi, Shimla), Uttarakhand (Dehra Dun, Mussoorie).

ii) *C. strabo riamus* (Fabricius – Wing expanse 26-32 mm. It varies much from *C. strabo strabo* : **Male** upperside deeper purple; fore

wing border broader, diffused inwardly and increasing towards apex; hind wing with a larger black tornal spot in area 2. Underside markings distinct. **Female** upperside with border deeper black and underside markings slightly broader. Andaman & Nicobar Islands, Assam. Malaya, Myanmar, Nepal, Pakistan.

iii) *C. strabo strabo* (Fabricius) – Wing expanse 25-32 mm. **Male** upperside pale lilac; fore wing more acute at apex; underside hind wing with black tornal spot reduced. Bihar, Jubbalpur, Mumbai, South India. Myanmar (Irrawady Valley), Sri Lanka.

Wing expanse: Male, female 25-35 mm.

Habits: This butterfly flies close to the ground for a short distance. It visits various low growing flowers of *Alternanthera, Tridax, Phaseolus* spp., etc. It basks early in the morning and late afternoons. It is a pest on plants.

Habitat and ecology: It is found all over India and is especially common in weedy, waste places upto 3050m in the hills. It is common in South India during monsoons. It is occurs in Dehra Dun during August-December and in Kumaon at elevations of 2400m during April – October.

Life history: The larva is light rose coloured and covered with tiny star topped stems so arranged as to make diagonal whitish lines to each segment. Its head is light yellow and margined with brownish. The body has a subdorsal line on the back and the square shaped anal segment. The margins of the body are clothed with light coloured and longish hair. The larva feeds on its food plant and is accompanied by ants the bait for which is exuded by an erectile organ on the 12th segment. The pupa is light rose coloured and covered with stiff erect hair. There is a black patch on the second segment and centre of thorax. It has a dark dorsal line and the lower segments are smudged with black.

Food-plants: *Acacia* sp.,*Alternanthera, Butea monosperma* (Flame of the Forest, Dhak, Palas), *Cajanus cajan* (Pigeon pea or Red Gram), *Desmodium oojeinense* (Sandan), *Paracalyx scariosus, Phaseolus, Schleichera oleosa* (Lac Tree, Macassar Oil Tree), *Tridax, Vigna unguiculata* (Cowpea) and many other Leguminaceae plants.

93. *Chilades lajus lajus* (Cramer)

Papilio lajus Cramer, 1780.

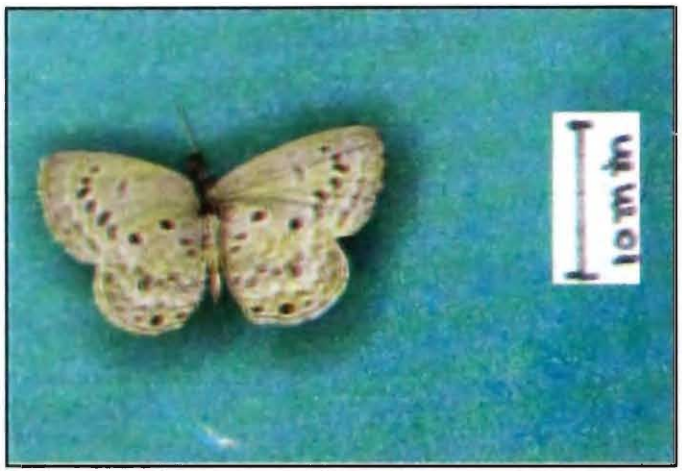
Chilades laius (Cramer): Bigham,1907; Evans, 1932; Wynter-Blyth, 1957; Cantlie, 1962.

Chilades lajus (Cramer): Varshney, 1997.

Common name: Lime Blue.

Diagnostic characters: Upperside of male purplish blue and female brown with more or less of blue suffusion at bases of wings. Underside of male hind wing without an ochreous patch at tornal area, or ocelli sprinkled with metallic green scales.

Morphological characters: **Male**- *Upperside* dull purple blue, thread-like dark border. *Underside* pale brown or grey with more or less the usual arrangement of spots; fore wing with additional costal spot in angle formed by junction of vein 7 and vein 9, spot in area 1b present; hind wing always with a spot at base in area 1c and discal spot in area 6 shifted in. In DSF, underside of hind wing with a large clouded dark discal patch. **Female**- WSF dark brown with bases metallic blue; DSF rather pale blue with a broad brown border.



Chilades lajus lajus- Male (Underside)

Variation: Only the nominate subspecies occurring in India shows seasonal variation and its wet season form being as darker and dry season form paler. Sometimes the ground colour on underside is much paler, almost white, particularly in the female.

Wing expanse: Male, female 26-30 mm.

Habits: A very ordinary looking little butterfly but DSF is distinctive. It is fond of sunshine and flies low over grass and around

its food plants. It is fond of settling on flowers and it is a pest on fruits.

Habitat and ecology: It is common throughout the plains of India wherever its food stuffs, Lime and Pomegranate are available. It occurs upto elevations of about 1200m in the hills.

Life history: The larva is pale green. When full-grown it is about 12mm in length. Its head is black, smooth and shining with a somewhat dark green dorsal line down the body. The entire surface is but very slightly shagreened and covered with extremely fine and short downy hairs. The constriction between the segments is slight. There are traces of two pale subdorsal lines, and there is a pale lateral line below the spiracles. The usual extensile organ on the 12th segment is short. The larva is attended by ants. The pupa is green with a dorsal and lateral series of somewhat obscure conjoined brownish spots on the upperside. It is attached to the underside of leaves of its food-plant in the usual manner.

Food-plants: *Atalantia* sp., *Citrus aurantifolia* (Lime, Kagzi Nimbu), *C. aurantium* (Orange, Khatta), *Limonia acidissima, Punica granatum* (Pomegranate).

Distribution: India, Assam, Maharashtra, Punjab, West Bengal. Fairly distributed in India. Elsewhere: Nepal, Myanmar and Sri Lanka.

Status: Common.

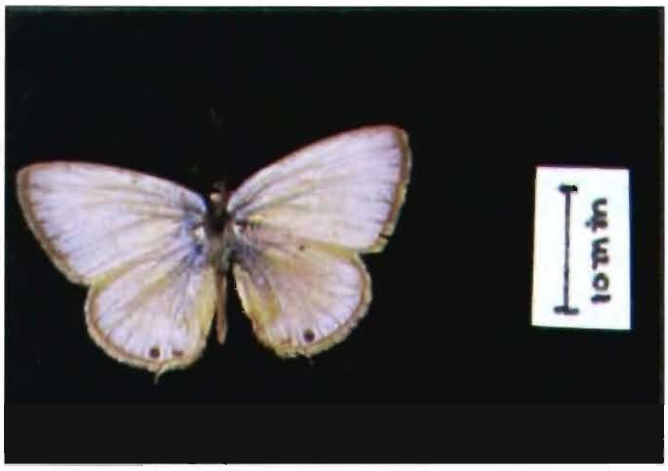
94. *Euchrysops cnejus* (Fabricius)

Hesperia cnejus Fabricius, 1798.
Catochrysops cnejus (Fabricius): Bingham, 1907.
Euchrysops cnejus (Fabricius): Evans,1932; Wynter-Blyth,1957; Cantlie, 1962; Varshney, 1997.

Common name: Gram Blue.

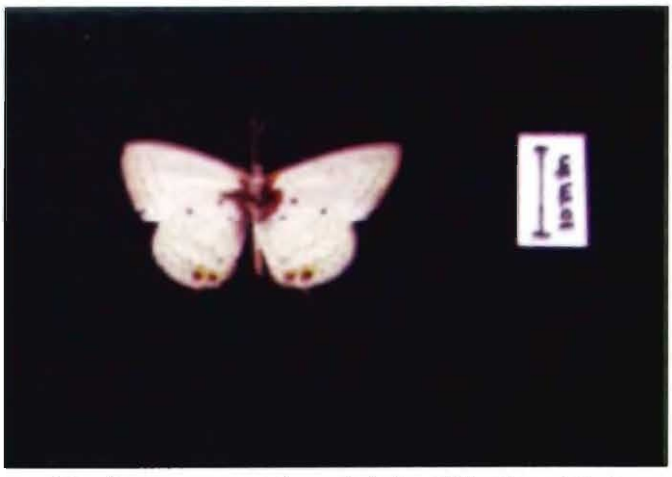
Diagnostic characters: Underside of hind wing with last spot of discal band in area 1b far from next spot in area 1c, two equal tornal spots present. Male with threadlike tail.

Morphological characters: **Male**- *upperside* pale violet blue, dark outer borders narrow; hind wing with two tornal black spots margined outwardly with white and inwardly with orange. *Underside* grey, with brown and white markings, hind wing with discal band tornally broken into separated spots, the last spot near dorsum in area1b well separated from next spot in area 1c, two nearly equal black tornal spots present, and no spot in area 1c below the cell spot. **Female**-As male but upperside brown, with bases and central parts of discs blue.



Euchrysops cnejus- Male (Upperside)

Variation: This species varies very little with the seasons but is very variable in size because it frequently chooses food-plant that is too small to supply the need of the larva, and, therefore, the small forms are due to semi stravation in the last stage of growth.

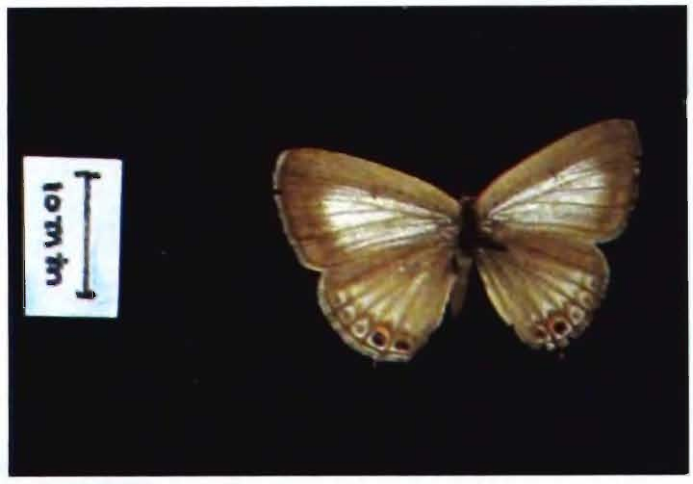


Euchrysops cnejus- Male (Underside)

Wing expanse: Male, female 25-33 mm.

Habits: The butterfly flies rapidly round shrubs and bushes, often rising high in the air. It is very fond of settling on flowers, particularly the male sucking their nectar. It drinks from damp patches and basks with its wings half open in sunshine. It is a minor pest of gram crops in South India.

Habitat and ecology: The butterfly is common throughout India up to elevations of 2400m. It is common in Kumaon up to 2400m during April-October but common everywhere in Palni Hills.



Euchrysops cnejus- Female (Upperside)

Life history: The larva is pale green, or brownish yellow with darker brownish longitudinal lines across the dorsum and the sides of it. Its entire surface is covered with small white tubercles and laterally with some scanty hairs. The head and stigmata are black. The larva is broader than high in its higher part, increasing in width to fourth segment, then of uniform width to the flattened anal segment. The ant-organ at the anal part is small. The larva lives on beans and is guarded by ants of various genera. The pupa is quite pale green, the abdominal rings somewhat opaque. The head capsule is almost quadrangular, thorax feebly gibbous and feebly indented before the first ventral ring. The dorsal line and stigmata are blackish.

Food-plants: *Acacia* sp., *Butea monosperma* (Dhak, Palas, Flame of the Forest), *Cajanas cajan* (Pigeon pea or Red Gram), *Citrus aurantifolia* (Lime, Kagzi Nimbu), *Crotolaria juncea* (Sunn Hemp), *Desmodium oojeinensis* (Sandan), *Dolichos catjang, Paracalyx scariosus, Vigna mungo* (Black Gram, Urd), *V. radiata* (Green Gram, Mung), *V. trilobata* (Mugam, Mugan), *V. unguiculata* (Cowpea) and others Leguminosae.

Distribution: India: Andaman & Nicobar Islands, Madhya Pradesh, Punjab, South India, Uttarakhand, West Bengal. Elsewhere: Myanmar, Nepal, Pakistan and Sri Lanka.

Status: Common.

95. *Freyeria putli* (Kollar)

Lycaena putli Kollar, 1848.
Chilades putli (Kollar): Moore, 1881.
Chilades trochilus (Freyer): Bingham, 1907.
Zizeeria trochilus putli (Kollar): Evans, 1932.

Zizeeria trochilus (Fryer) (and *Z. putli* (Kollar)): Wynter-Blyth, 1957.
Freyeria trochilus putli (Kollar): Cantlie, 1962.
Freyeria putli (Kollar): Bridges,1988; Varshney, 1997.

Common name: Grass Jewel.

Diagnostic characters: Very small and upperside dark brown. Underside of hind wing with a marginal row of jewelled metallic spots not orange-crowned.

Morphological characters: **Male**- *upperside* dark brown; hind wing with dark marginal spots faint and not orange crowned. *Underside* brown; fore wing without a spot in cell or on costa internal to the discal band; hind wing with a marginal row of jewelled metallic spots not prominently orange crowned, basal and costal spots black and rest dark brown. **Female**- Like male but *upperside* of hind wing with marginal spots slightly (often prominently) bordered with ochreous; *underside* of both fore- and hind wing with markings more distinct than in male.

Freyeria putli- Female (Upperside)

Variation: The marginal row of jewelled metallic spots may be bordered with ochreous or very rarely bordered with orange.

Wing expanse : Male, female 15-22 mm.

Habits: The butterfly is weak flier, flying close to the ground. The individuals roost in groups in the grasses. It often settles on the ground and on low growing flowers. It is the smallest Indian butterfly.

Habitat and ecology: It usually likes dry and sandy plains avoiding densely overgrown places.

Life history: The full grown larva is a little over a quarter of an inch in length. It is onisciform. Its head is very small, black and

shining, entirely hidden when at rest, being covered by the second segment. The colour of the body is grass-green, with a dark green dorsal line from the third to the twelfth segment; two subdorsal series of short parallel streaks, each pair being divided from the next by the segmental constriction, these streaks being paler than the ground colour. A most conspicuous of all the markings is a white lateral line below the spiracles. The pale green pupa is about three-sixteenths of an inch in length. It is densely covered everywhere, except on the wing-cases, with somewhat long white hairs.

Food-plants/Ant : *Heliotropium strigosum* (Chitphul), *Indigofera* sp., *Lotus corniculatus* (Birdsfoot Trefoil), *Rhynchosia minima*, Vetches, *Zornia diphylla*.

The Larva is attended by the ants of *Pheidole quadrispinosa* Jerdon.

Distribution: India: Arunachal Pradesh, North-east India, Punjab, South India, West Bengal. Elsewhere: Myanmar, Sri Lanka.

Status: Common.

96. *Jamides alecto* Felder, 1860

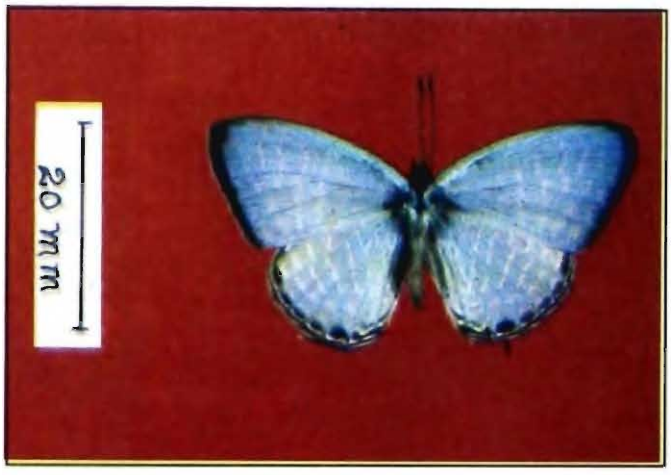
Jamides alecto Felder, 1860.
Jamides alecto Felder: Varshney, 1997.

Common name: Metallic Cerulean.

Diagnostic characters: Male upperside bluish white to shining blue with narrow black outer margin, the latter thread like on hindwing. Female upperside paler blue with a broad black border on fore wing and hind wing with marginal black spots.

Morphological characters: *Underside* of fore wing with 1st and 2nd white lines from base continuous across cell to inner margin, 3rd line from costa to vein3, 4th line to vein 4 and apically elbowed. **Male-** *upperside* of fore wing with dark border of about 1 mm, increasing apically; hind wing with apically decreasing row of marginal spots. Wet season form- *upperside* very pale shinning violet-blue and semi-

transparent; underside grey to brown and strongly marked. Dry season form- *upperside* milkier blue and more opoque; *underside* pale yellowish brown and faintly marked. **Female-** *upperside* paler blue with a broad black border on fore wing and hind wing with marginal black spots.



Jamides alecto alocina- Male (Upperside)

Variation: The species is variable. The following three subspecies are found in India.

i) *Jamides alecto alocina* Swinhoe- Wing expanse 30-44mm. Male- WSF more or less transparent; upperside pale, rather purplish blue, with a black diffuse border; underside grey to brown and strongly marked. DSF milkier and opaque, underside pale ochreous brown and faintly marked. Sikkim, South India. Myanmar.

Jamides alecto alocina- Male (Underside)

ii) *Jamides alecto fusca* Evans -Wing expanse 40-45mm. Upperside of hind wing with postdiscal fuscous markings traceable from vein 3 to apex. Andamans.

iii) *Jamides alecto kondulana* Felder- Wing expanse 34-40mm. Male upperside pale shiningbluish white; fore wing with a series of diffuse fuscous strigae against the submarginal line; hind wing with submarginal spots more rounded, fuscous postdiscal markings visible apically. Underside markings very narrow, hind wing tornal ocellus and orange crown very large. Central and South Nicobars.

Wing expanse: Male, female 30-45 mm.

Habits: The butterfly displays beautiful metallic colouration. It is common in hilly jungle regions. It attacks the flowers and young fruit. It also causes a considerable damage to Cardamom.

Jamides alecto alocina- Female (Upperside)

Habitat and ecology: It is common in hilly jungle regions of light and heavy rainfall, where there is cover, except in the arid northern parts of the country.

Life history: The larva is greyish and across the dorsum tinted reddish, with narrow reddish dorsal and similar subdorsal lines. Its head is small and brown. It lives on the fruits of its food plants. The pupa is similar to that of *Jamides celeno*, of a dingy yellowish-brown, marbled with dark brown spots being on the dorsum combined in 3 irregular stripes. It is found in the interior of the fruits.

Jamides alecto alocina- Female (Underside)

Food-plants: *Boesenbergia pandurata, Elettaria cardamomum* (Cardamom, Chhoti Elaichi), *Kaempferia rotunda* (Bhuichampa).

Distribution: India: Andaman & Nicobar Islands, Sikkim, South India. Elsewhere: Myanmar, Sri Lanka.

Status: Common to not rare. The subspecies, *Jamides alecto kondulana* Felder is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

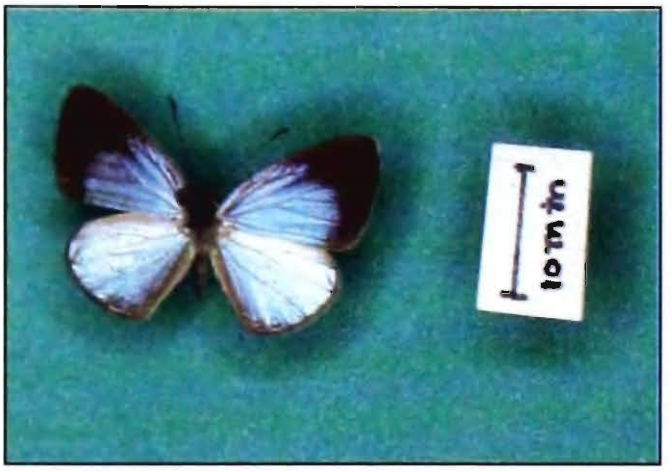
97. *Jamides bochus* (Cramer)

Papilio bochus Cramer, 1782.

Jamides bochus (Cramer): De Niceville,1890; Wynter-Blyth, 1957; Cantlie,1962; Varshney, 1997.

Lampides bochus (Cramer): Bingham, 1907.

Common name: Dark Cerulean.



Jamides bochus bochus- Male (Upperside)

Diagnostic characters: Medium size. Brilliant dark mettalic blue with broad black border on fore wing. Female much duller.

Morphological characters: **Male**- *upperside* brilliant dark metallic blue; fore wing border and apex broadly black; hind wing with border narrow but borders narrower in DSF. *Underside* dark brown, inner submarginal line not lunulate, markings dull and narrow; fore wing with 3rd white line from base continuous from costa to dorsum, 4th white line bent apically and ending on vein 3. **Female**- like male, but of a dull non-metallic blue and with marginal black spots on hind wing.

Variation: The species is variable.

There are two subspecies in India.

i) *Jamides bochus bochus* (Cramer)- Upperside of fore wing with costa black in male Andamans, Assam, India. Myanmar, Nepal, Pakistan, Sri Lanka.

ii) *Jamides bochus nicobaricus* (Wood-Mason & De Niceville)- Upperside of fore wing with costa blue, at least at base. Nicobars.

Wing expanse: Male, female 25-34 mm.

Habits: Its flight is extremely rapid, usually round bushes or trees, either in the open or in the half-shade of the jungle. They often settle on leaves rather than on flowers. This species shows beautiful and intense blue metallic colouration.

Habitat and ecology: It is found almost all over India except in the arid North-west. The males may be taken on damp patches and are caught more often than the females as the latter keep higher among the trees. It ascends 1980m.

Life history: The egg is laid single in a bud. The little larva on emerging from the egg burrows into a bud and lives inside the flower, changing from one to another and eating the carpels and pistils. It is sometimes attended by ants. It is covered with small fine hairs and in its form and marking entirely resembles that of *Catachrysops pandava*. The full grown larva is olive-green, turning olive-brownish before the pupation. It pupates inside the flower or on the ground under leaves, etc., or in a small crevice or hole. The attachment is by the tail and a body band.

Food-plants: *Butea monosperma* (Dhak, Palas, Flame of the Forest), *Cajanus cajan* (Red Gram, Pigeon Pea, Congo Pea), *Citrus* sp., *Crotalaria* sp., *Pongamia pinnata* (Indian Beech, Pongam Oil Tree), *Tephrosia candida* (White Tephrosia), *Vigna unguiculata* (Cowpea), *Xylia xylocarpa*..

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Assam, West Bengal. Elsewhere: Myanmar, Nepal, Pakistan and Sri Lanka.

Status: Common.

98. *Jamides celeno* (Cramer)

Papilio celeno Cramer, 1775.
Lampides celeno (Cramer): Bigham, 1907.
Jamides celeno (Cramer): Evans, 1932; Wynter-Blyth, 1957; Cantlie,1962; Varshney, 1997.

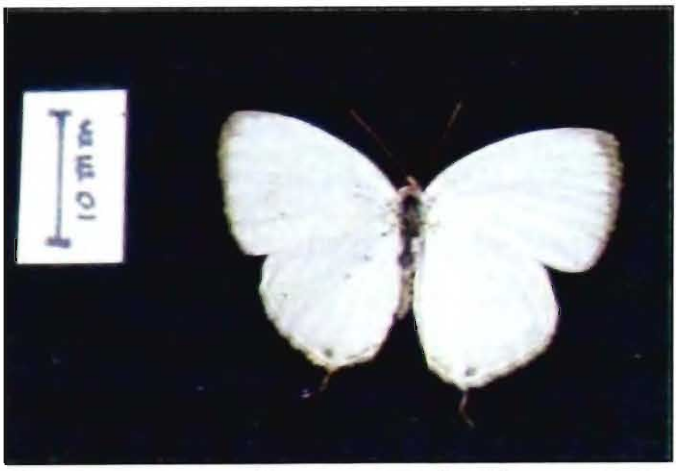
Common name: Common Cerulean.

Diagnostic characters: Male pale milky-blue (not mettalic blue) with narrow dark borders on fore wing but borders broad in female. Underside with bands.

Morphological characters: **Male**- *upperside* pale bluish white, with a thread-like border at tornus but widening l-2 mm at apex; *underside* of fore wing with fourth white line from base straight, areas between white lines filled in to form dark bands in dry season form. **Female**- Like male but upperside dull blue with dull brownish black broad border.

Variation: This species is very variable and its four subspecies are found in India.

i) *J. celeno aelianus* (Fabricius)- (27-40mm). Upperside whiter and underside of hind wing without submarginal spots. India. Myanmar, Pakistan.



Jamides celeno aelianus - Male (Upperside)

ii) *J. celeno blairana* Evans- (27-35mm). Upperside whiter and underside ofhind wing with submarginal spots. No dry season form. Andamans.

iii) *J. celeno kinkurka* Felder- (27-32mm). Male upperside with an inner fuscous border. Car and Central Nicobars.

Jamides celeno aelianus - Male (Underside)

iv) *J. celeno nicevellei* Evans- (30-37mm). Male upperside overlaid with fuscous scales, leaving only a narrow pale submarginal fascia.

Wing expanse: Male, female 27-40 mm.

Habits: It is a slow flier and is also one of the most magnificent and conspicuous butterflies It has weak, fluttering kind of flight keeping low down about bushes and hedges, except when the female is looking for a

taller food plant. It flies in the half shade or at the edges of woods or jungle avoiding sunshine, and sustaining long flight. It rests on leaves and does not visit flowers. It sometimes drink from wet patches or damp roads. The female searches for its food plants for a considerable period and the male usually taking a position on a prominent leaf and chasing away any small butterfly coming near it.

Jamides celeno aelianus - Female (Upperside)

Habitat and ecology: It is found almost everywhere in jungle, on the plains, in the hills and in regions of light and heavy rainfall, where there is cover, except the arid northern parts of the country. Apart from the *J. bochus*, it is the only species among others of this genus which is found outside forest areas. It is common to elevations of about 1980- 2135m in South India.

Jamides celeno aelianus - Female (Underside)

Life history: The larva is woodlouse-shaped, thinly covered with fine fluffy hairs, on the sides of the dorsum with oblique diffuse spots. The full grown larva is about 15mm in length. It is of a dull reddish-green colour and thickly shagreened with minute white tubercles, scarcely, if at all, hairy. Its head is pale ochraceous, entirely hidden beneath the second segment. The segments increase in width to about the fifth, the two anal segments slightly decreasing and above flattened, paticularly the thirteenth, and the erctile organs are very small. There is a dorsal pulsating line, somewhat darker than the rest of the body. A subdorsal series of pale green oblique streaks runs one on each segment on each

side from the third to the eleventh sgment, and no other conspicuous markings. It is attended by the ant. The surface of pupa is quite smooth. It is ochreous greenish, with the upper portions of the abdominal segments darker. Its head is bluntaly rounded, thorax slightly humped and constricted posteriorly. The upper portions of the abdominal segments are darker and covered throughout with coarse, rounded and blackish spots placed irregularly. A dorsal and subdorsal series are of similar but larger spots or blotches placed regularly. The end of the abdomen is rounded.

Food-plants: *Abrus precatorius* (Indian Liquorice, Rati, Gunchi, Kunch), *Butea monosperma* (Dhak, Palas, Flame of the Forest), *Heynea trijuga* (Kapia-Kushi), Flowers and leaves of *Pongamia pinnata* (Indian Beech, Pongam Oil Tree), *Saraca asoca* (Ashoka), *Tephrosia candida* (White Tephrosia).

Distribution: India: Andaman & Nicobar Islands, Assam, Madhya Pradesh, South India, West Bengal. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Common.

99. *Lampides boeticus* (Linnaeus)

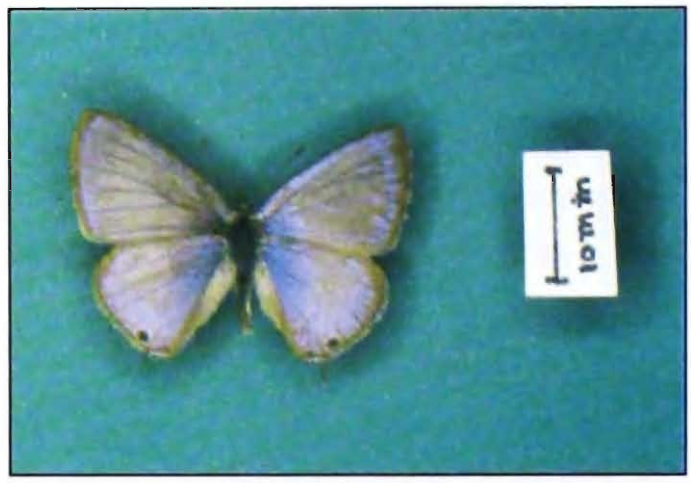
Polyommatus boeticus Linnaeus, 1907.
Polyommatus boeticus (Linnaeus): Bingham, 1907.
Lampides boeticus (Linnaeus): Evans, 1932; Wyner-Blyth, 1957; Cantlie,1962; Varshney, 1997.

Common name: Peablue.

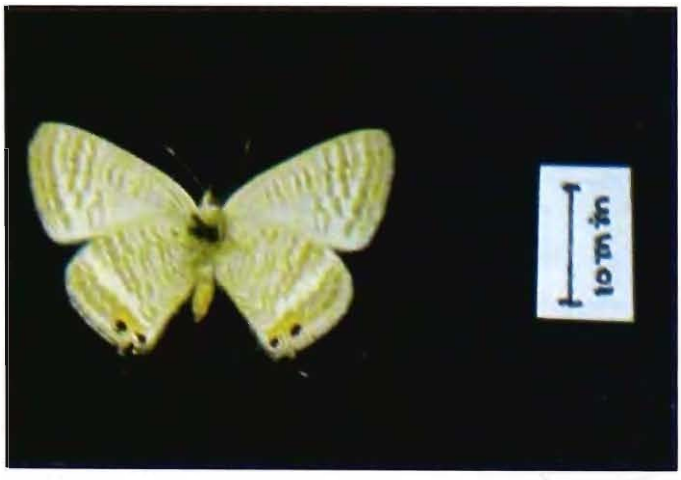
Diagnostic characters: Medium size. Male-Tailed and paler brighter voilet blue, a black spot at tornus on hind wing; female brown with bases and central parts of discs blue.

Morphological characters: **Male-** Tailed. *Upperside* violet-blue, overlaid with long hair like scales giving the wings a frosted appearance; fore wing costal margin narrowly and the termen evenly and more broadly brown; hind wing with the costa and apex broadly and termen

very narrowly brown, areas 1 and 2 with subterminal spots, each surrouded by an obscure ring of bluish lighter than the groud colour; tail black tipped with white. *Underside* pale greyish or brownish ochraceous; fore wing transversely crossed by more or less parallel pale brown fasciae- four across the cell and five beyond the cell and none of these fasciae reaching costa; hind wing crossed from base to beyond middle by eight or nine pale brown fasciae as on fore wing (these fasciae more or less fused and broken), then a distinct and broader greyish fascia, two submarginal linear brownish fasciae and two black orange-crowned tornal spots. **Female-** like male but *upperside* dark brown, blue basally; fore wing with a discal bluish patch; hind wing with two outer greyish submarginal fasciae.



Lampides boeticus- Female (Upperside)



Lampides boeticus- Female (Underside)

Variation: It is most variable in size and sometimes curious aberrations occur. In male, the underside of fore wing may be pale greyish or brownish ochraceous. In female, iridescent bluish at bases on wings may extend outwards towards the disc.

The following single form of this species occurs in India.

Lampides boeticus f. *obsoleta* Evans- Except for the tornal spots on hind wing all the marginal markings are absent in fore- and hind wings. Andamans.

Wing expanse: Male, female 24-36 mm.

Habits: The male flies quickly around bushes and settles on flowers. The female is a very persistent migrant and has wide distribution coupled with its wide choice of food-plants—all leguminous. It is fond of open places and sunning itself with the wings half opened. This species is a pest on *Pisum sativum* (Pea).

Habitat and ecology: This species is one of the widely distributed of all the Blues. In North-west India it migrates in large numbers from the South-east during March -April. It is also found on damp patches and flies over 3050m of elevation.

Life history: The full grown larva measures 12mm in length. It is pale and dull green throughout, slightly shagreened but not hairy except slightly at the sides. The larva feeds on the yellow pea-like flowers and on the pods. Three species of ants attending the larva are- *Camponotus compressus* (Fabricius), *Tapinoma melanocephalum* (Fabricius) and *Prenolepis obscura* (Fabricius). The pupa is pale yellowish-green and its entire surface is smooth. Its the posterior end is very blunt and rounded. The female pupae emerge from well-fed larvae and differing from male pupae by a somewhat stronger abdomen The pupation lasts for ten days and the imago emerging mostly in the afternoon.

Food-plants/Ants: *Butea monosperma* (Dhak, Palas, Flame of the Forest), *Cajanus cajan,* (Red Gram, Pigeon Pea, Congo Pea), *Canavalia* sp., *Cicer arietium* (Bengal Gram), *Colutea* sp., Flowers or unripe seeds of green pods of *Crotalaria anagyroides, Crotalaria calycina, C. capensis, C. incana, C. juncea* (Hemp, Sann, Sunn), *C. mucronata* (Sen, San), *C. pallida, C. saltiana, Dolichos lablab* (Lablab Bean), *Indigofera* sp., *Lathyrus* sp., *Lupinus* sp., *Medicago* sp., *Melilotus* sp., *Pisum sativum* (Pea), *Podalyria* sp., *Pueraria tuberosa, Sesbania* sp., *Sutherlandia* sp., *Trichodesma indicum* (Chhta-Kulpha), *Vigna mungo* (Black Gram, Urd), *V. radiata* (Green Gram, Mung), *V. unguiculata* (Cow Pea), *Virgilia* sp.

Ants: Camponotus compressus (Fabricius), *Tapinoma melanocephlum* (Fabricius) and *Prenolepis obscura* (Fabricius).

Distribution: India: Andaman & Nicobar Islands, Arunachal Pradesh, Madhya Pradesh, North-east India, Uttar Pradesh, West Bengal. Elsewhere: Nepal, Pakistan and Sri Lanka.

Status: Very common but rare in Andaman & Nicobar. The subspecies, *Jamides alecto kondulana* Felder is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

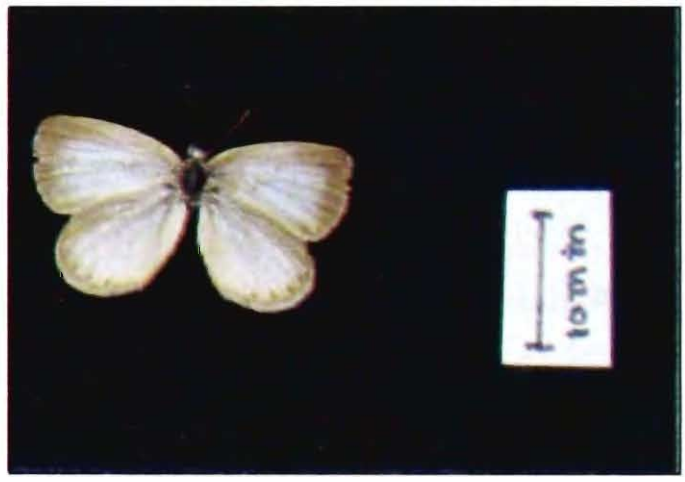
100. *Pseudozizeeria maha* (Kollar)

Lycaena maha Kollar, 1844.
Zizera maha (Kollar): Bingham, 1907.
Zizeeria maha (Kollar): Evans,1932; Wynter-Blyth,1957; Cantlie, 1962.
Pseudozizeeria maha (Kollar): Haribal, 1990; Bridges, 1994; Varshney, 1997.

Common name: Pale Grass Blue.

Diagnostic characters: Male upperside pale blue with broad black borders and female upperside dark brown with more or less blue scaling.

Morphological characters: **Male-** *upperside* pale blue with broad dark borders. *Underside* of fore wing often with a small basal spot in area 1b, a spot in cell and a bar at end of cell present; hind wing with outer discal spot in area 6 midway between, and in line with, the spots in areas 5 and 7. **Female-** *upperside* dark brown with more or less basal blue suffusion.



Pseudozizeeria maha maha- Male (Upperside)

Variation: Underside markings are prominent on both wings but these may be small or obsolete in hind wing.

There are two subspecies in India.

i) *Pseudozizeeria maha maha* (Kollar)- Upperside of usually darker, underside markings prominent, and two distinct seasonal forms- paler dry season form and darker wet season form. Assam, Central India, North India, Sikkim. Myanmar, Nepal, Pakistan (Baluchistan, Kurram).

ii) *Pseudozizeeria maha ossa* Swinhoe- Central India, South India.

Pseudozizeeria maha maha- Male (Underside)

Wing expanse: Male, female 26-30 mm.

Habits: The butterfly is a slow flier. The male flies weakly and keeps close to the ground. Its flght is never long-sustained. It is fond of the sunshine and basks with its wings partly open, but when it feeds or rests it keeps its wings closed.

Habitat and ecology: It is abundant in the hills but much less on the plains. The females are found in the well shaded positions, along ditches, by the sides of water and under trees during the rains. Here, they are numerous, in the afternoons, during the last months of the monsoon, for laying eggs.

Pseudozizeeria maha maha- Female (Underside)

Life history: The eggs are usually laid singly on the underside of leaves and rarely on upperside. The little larva is very light in colour and its segments are very well marked with long curved hairs. It starts feeding on the underside by eating all but the upper cuticle which then withers and the larva can be easily located. It grows rapidly and the full grown larva is about 10mm in length, green, with a dorsal line of a darker green. Its head is smooth and shining. Sometimes larger caterpillars are attended by ants. The pupation takes place anywhere; on the underside of leaf of the same plant or another plant or on a well protected surface of a stone—the attachment is by the tail and body band is as usual.The pupa is pale green and the pupal stage lasting for seven days.

Food-plants: *Nelsonia* sp., *Oxalis corniculata* (Indian Sorrel), *Strobilanthes* sp., *Tephrosia subtrifolia.*

Distribution: India: Assam, Madhya Pradesh, Himachal Pradesh, North India, Punjab, Sikkim, South India, West Bengal. Elsewhere: Myanmar, Nepal, Pakistan.

Pseudozizeeria maha maha- Female (Upperside)

Status: Common.

101. *Heliophorus sena* (Kollar)

Polyommatus sena Kollar, 1844.
Ilerda sena (Kollar): De Niceville, 1890.
Heliophorus sena (Kollar): Evans,1932; Wynter-Blyth,1957; Cantlie, 1962; Varshney, 1997.

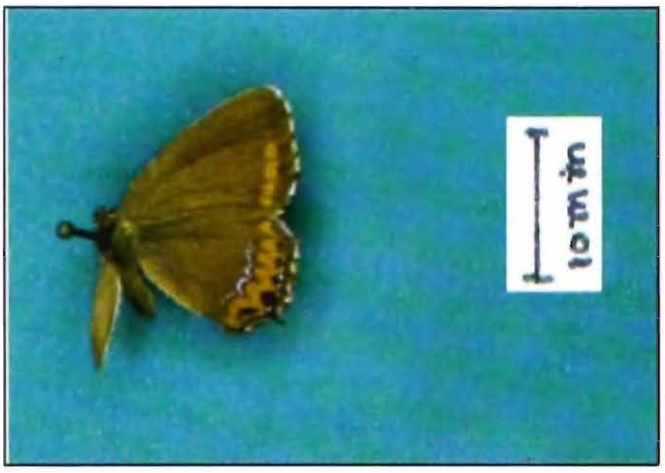
Common name: Sorrel Sapphire.

Diagnostic characters: Upperside dark shining violet blue with orange band on border of hind wing. Underside pale ochreous to ochreous brown with orange margin.

Morphological characters: **Male**- *upperside* dark shining violet blue; fore wing with broad dark border; hind wing with red marginal band and tailed at vein 2. *Underside* pale ochreous to ochreous brown; a prominent white line inside the red marginal area (in both wings); hind wing with prominent costal and dorsal black spots near base. **Female**- *upperside* dark brown, red marginal band of hind wing may be more or less continued onto fore wing.

Variation: On upperside of hind wing a fine blue line following its inner margin may be sometimes present in male.

Wing expanse: Male, female 28-33 mm.

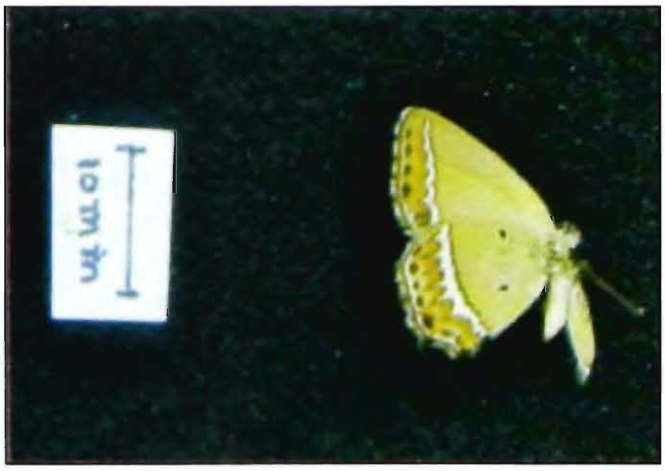


Heliophorus sena- Female (Upperside)

Habits: The butterfly flies quickly for a short distance, settles frequently on flowers, on rocks and on leaves of low-growing herbage. This species is abundant almost all the year wherever the Common Sorrel of the Himalayas grows, that is, on fairly dry and open ground.

Habitat and ecology: It is abundant almost all the year whereever the Common Sorrel of the Himalayas grows on the fairly dry and open ground. It is also found on open hill sides and at water in the ravines. It ascends 600-2700m.

Life history: The female lays eggs on Sorrel leaves. The half grown larva is pale yellowish green. Its whole surface is thickly shagreened and covered with rather long bristle hairs. There is a narrow dark dorsal line and no other markings. In shape, the larva is about as high as broad, of nearly equal breadth, hardly tapering at either end, the fourth segment rather wider than the rest. The constrictions between the segments are slight. The full grown larva is about 12mm in length. It is pale dirty greenish mottled with dirty dull crimson with the narrow dorsal line also dull crimson and that being the only conspicuous marking. It is flattened and broader than high. Its both ends are rounded. The segments (except the second and last) are of almost equal breadth and the constrictions between the segments are shallow. The head is entirely hidden as usual under the



Heliophorus sena- Female (underside)

second segment, pale greenish, anteriorly becoming rather dark, and the legs are also pale greenish. The pupa is 8 mm in length and of usual lycaenid shape and bluntly rounded at both ends. It is pale greenish and profusely sprinkled with blackish and without markings. Its whole surface is rough and covered with minute points, but not hairy. The thorax is slightly humped and a little constricted where it joins the first abdominal segment.

Food-plants: *Rumex hastatus* (Sorrel).

Distribution: India: Himachal Pradesh, Jammu & Kashmir, Uttarakhand. Elsewhere: Nepal, Pakistan.

Status: Very common.

102. *Lycaena phlaeas* (Linnaeus)

Papilio phlaeas Linnaeus, 1761.
Chrysophanus phlaeas (Linnaeus): De Niceville, 1890.
Lycaena phlaeas (Linnaeus): Evans,1932; Wynter Blyth, 1957; Cantlie, 1962; Varshney, 1997.

Common name: Common Copper.

Diagnostic characters: Upperside of wings copper coloured; hind wing with tornus and ending of first median vein produced into a tooth.

Morphological characters: **Male**- *upperside* of fore wing dark shining copper with black spots; disc more or less overlaid with blackish scales; hind wing dark brown with small bluish discal spots, marginal band copper coloured. *Underside* of fore wing apex broad grey brown; hind wing grey-brown; spots minute and no white band or submarginal spots. **Female**- Like male but upperside with copper coloration brighter.

Variation: The species is variable and its three subspecies occur in India.

i) *L. phlaeas baralacha* Moore - Wing expanse 28-34 mm and upperside in male with brown suffusion intense, leaving only the base metallic copper. Outer Himalaya, Kashmir, Kumaon.

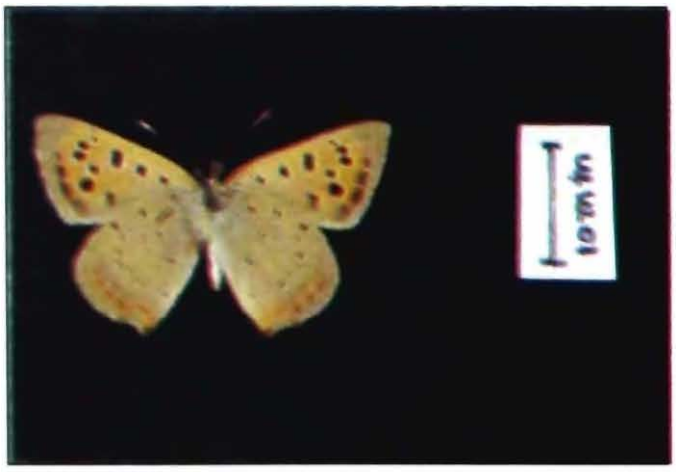
ii) *L. phlaeas flavens* Ford - Wing expanse 30-34 mm. Upperside pale but bright, and brown suffusion usually scanty, and veins black on fore wing. Interior Himalaya, Sikkim. South-east Tibet.

Lycaena phlaeas baralacha - Male (Upperside)

iii) *L. phlaeas stygianus* Butler - Wing expanse 26-30 mm, upperside pale and brown suffusion usually scanty.Ladak. Baluchistan, Chitral.

Wing expanse: Male, female 26-34 mm.

Habits: This beautiful butterfly displaying metallic copper colouration, loves sunshine and open places, particularly waste ground where there has been cultivation. It does not fly fast and keeps close to the ground, settling on low-growing flowers.



Lycaena phlaeas baralacha- Male (Underside)

Habitat and ecology: It is one of the commonest butterflies, flying up to 3950-4550m high in the hills of the interior, but are found as low as at elevations of 760m at Shimla and Mussoorie. It is very common above 2280m in North-west Himalaya from early spring to autumn.

Life history: The larva is apple green and its head dingy green. The suface of the body bears white warts and brownish yellow bristles. The green colour on surface may be interrupted by three stripes of a delicate purplish-pink, one of them being medio-dorsal and the others marginal. The pupa is dirty white and speckled with black or dark brown.

Food-plants: *Rumex nepalensis* (Palak, Pahari Palang).

Distribution: India: Interior and outer Himalaya, Himachal Pradesh, Jammu & Kashmir, Sikkim, Uttarakhand. Elsewhere: Pakistan, South-east Tibet.

Status: Common.

103. *Spindasis vulcanus vulcanus* (Fabricius), 1775

Papilio vulcanus Fabricius, 1775.
Aphnaeus vulcanus (Fabricius): De Niceville, 1890
Spindasis vulcanus (Fabricius): Wynter-Blyth, 1957;Varshney, 1997.
Spindasis vulcanus vulcanus (Fabricius): Evans,1932; Cantlie, 1962.

Common name: Common Silverline.

Diagnostic characters: Upperside brown and hind wing with an orange patch.Underside with orange, black edged, silver-centered bands.

Morphological characters: **Male-** *upperside* dark brown and not or only faintly blue shot; fore wing with black-spotted broader orange areas. *Underside* pale yellow with conspicuous black-edged red bands; fore wing with a basal streak along costa to central cell bar, markings in cell consisting of a streak from base under the subcostal vein and a spot beyond, these two may be conjoined or separate; hind wing with bands evenly spaced, the sub-basal band entire and ending on vein 1b and not continued along it. **Female-** *upperside* without conspicuous leaden-coloured scaling.

Variation: Only the nominate subspecies occurs in India. In dry season form, a basal streak along costa to central cell bar may only be indicated by a few silvery scales on underside of fore wing and also a streak in cell may be absent.

Wing expanse: Male, female 26-34 mm.

Habits: This butterfly displaying metallic colouration is generally gregarious and a number of them will often be seen flying round the same bush. It is fond of settling on leaves and feeding upon garden flowers.

Habitat and ecology: It prefers the open plains and lightly wooded areas It is found all over India, except in the desert tracts, in North-east India, and up to 2450m in the hills.

Life history: The eggs are laid on a plant near the ants of the genus *Crematogaster*. The ants look after the little larvae from the begining. The larvae do not get on well without ants. On growing larger, the larvae make little cells (like that made by spiders) in any crease or hollow in the leaf surface, fastening the edges of the cell with silk and lining the inside thickly. There are many ants attending and they climb all over the caterpillars, a half dozen may sometimes be seen at a time. The pupation take place in the cell. The pupa is attached by the cremaster as well as the body band. The cell is untidy and irregular and is a permanent abode, the inmate going outside to feed on the underside of leaves, always leaving the cuticle of the upperside intact, even in the full grown stage. The pupal stage lasts for ten days.

Spindasis vulcanus vulcanus- Female (upperside)

Spindasis vulcanus vulcanus- Female (Underside)

Food-plants: *Acacia leucophloea* (Safed Kikar, Safed Babul), *Allophylus cobbe, Canthium parviflorum* (Kadbar), *Clerodendrum indicum* (Bharangi), *Zizyphus mauritiana* (Ber, Indian Jujubu, Common Jujubu), *Z. rugosa.*

Distribution: India: Punjab, Uttarakhand, West Bengal, widely distributed in continental and peninsular India. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Common.

104. *Arhopala amantes* (Hewitson)

Amblypodia amantes Hewitson : Bingham, 1907; Evans, 1932; Wynter-Blyth, 1957

Narathura amantes (Hewitson): Evans, 1957; Gupta, 1997; Varshney, 1997.

Arhopala amantes (Hewitson): Bridges, 1988.

Common name: Large Oakblue.

Diagnostic characters: Wings tailed. Wing expanse more than 44mm. The underside discal line dislocated at vein 4.

Morphological characters: **Male**- *upperside* of fore- and hind wings brilliantly dark shining blue; costal and outer margins with black border of 1-4mm in width.Underside of wings with markings banded and daker than the ground colour; fore wing with dark area under cell extending to discal band, the latter broken at vein 4 and the upper part directed to termen; hind wing cell less than half the length of the wing, discal band not completely dislocated at vein 2 and discal spot in area 6 outwardly concave, diffused metallic green scales on tornal lobe, the latter not prominently projecting. **Female**- like male but upperside paler with blue colouration of upperside confined to half of the wings and black borders very broad; a tooth at end of cell present in fore wing.

Variation: The underside of fore- and hind wings shows some shade of lilac-grey or grey-brown colouration.

Two subspecies occur in India.

i) *Arhopala amantes amantes* (Hewitson)- Male having upperside of wings shinining blue and narrow black borders of 0.5 mm but female is lighter with black borders very broad and underside grey brown and paler apically on fore- and hind wings. North Kanara, Poona, South India. Sri Lanka.

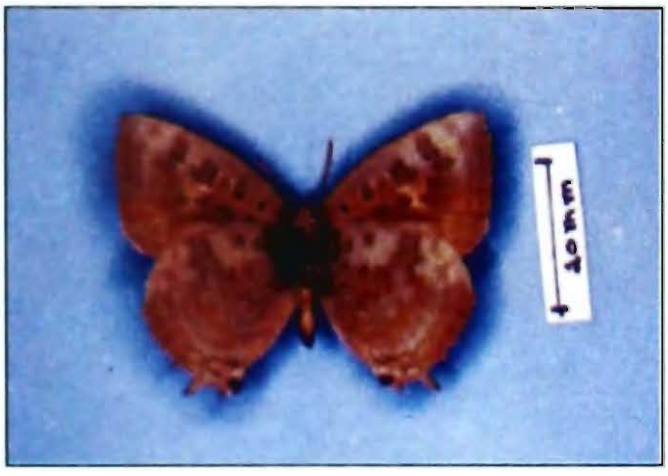
ii) *Arhopala amantes apella* (Swinhoe)- Its *WSF* is darker in heavy rainfall areas and DSF is lighter occurring in dry localities. Bihar (Ganjam), Madhya Pradesh ((Mhow, Central India), Orissa, Sikkim, Uttarakhand (Kumaon, Mussoorie), West Bengal. Borneo.

Wing expanse: Male, female 45-57 mm.

Habits: This is one of the largest and beautiful butterflies with brilliant metallic blue colouration. Its flight is strong and rapid, the butterfly concealing itself under leaves with wings always folded. It is fond of resting on the leaves of Mango-tree.

Arhopala amantes apella- Female (Upperside)

Habitat and ecology: It is found visiting shrubby parts of Cinnamom plantations during May-June. It occurs in jungles on the plains and along the foot of the Himalayas.



Arhopala amantes apella- Female (Underside)

Life history: The larva is elongated, oval, depressed at the ends, anterior segments scutate, with a lateral row of fine short hair. It is green with two subdorsal reddish lines and a red patch on the second and last segments. The interdorsal space is marked with blackish spots, lines and a lateral row of spots. The pupa is broad with thorax and wing-cases greenish and abdomen reddish.

Food plants: *Hopea jucunda, Lagerstroemia lanceolata, L. speciosa* (Queen Crape Myrtale), *Shorea robusta* (Sal), *Terminalia alata* (Asan), *T. catappa, T. paniculata* (Flowering Murdah), *Xylia xylocarpa.*

Distribution: India: Andaman & Nicobar Islands, Assam, Kanataka, Madhya Pradesh, Maharashtra, Sikkim, South Bihar, South India, Uttarakhand, West Bengal. Elsewhere: Sri Lanka.

Status: Locally common.

105. *Arhopala eumolphus eumolphus* (Cramer)

Papilio eumolphus Cramer, 1780.
Amblypodia eumolphus (Cramer): De Niceville, 1890; Wynter-Blyth, 1957.
Amblypodia eumolphus eumolphus (Cramer): Evans, 1932.
Narathura eumolphus (Cramer): Evans, 1957; Varshney, 1997.
Arhopala eumolphus (Cramer): Bridges, 1988.

Common name: Green Oakblue.

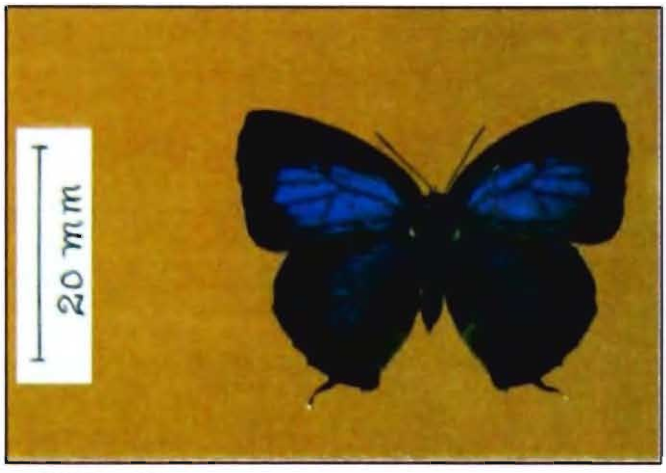
Diagnostic characters: Upperside of wings shining green with black borders in male and purple blue having broader black borders in female.

Arhopala eumolphus eumolphus- Male (Upperside)

Morphological characters: **Male**- fore- and hind wings not produced, termen convex in fore wing. *Upperside* of wings brilliant shining brassy-green; on fore wing green extending nearly to apex, black border 3mm at apex to 4mm at dorsum; green extending to just beyond end of cell and black border broader. *Underside* rather pale reddish brown; fore wing having pearly white shining rings enclosing brown spots and hind wing having brown spots narrowly edged with grey and three black spots bordered on inner edge with a green band covered with golden lusture. **Female**- *upperside* purple blue with

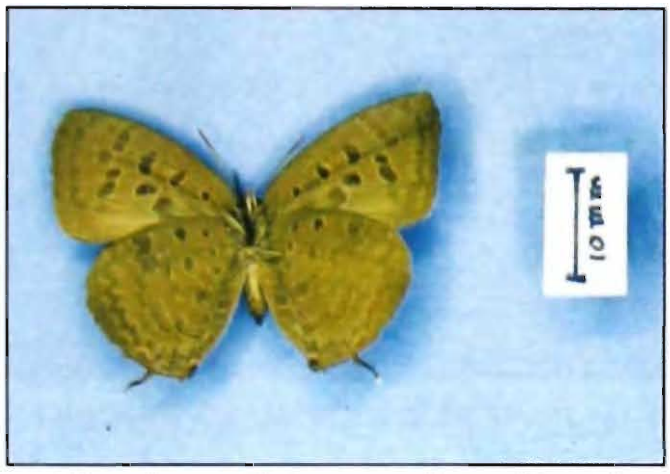
Arhopala eumolphus eumolphus- Male (Underside)

black borders 6-7mm in width, a large paler bluish violet patch at base and middle of fore wingand in the cell in hind wing; *underside* pale reddish brown.



Arhopala eumolphus eumolphus- Female (Upperside)

Variation: Only the nominate, *A. eumolphus eumolphus* (Cramer) occurs in India. It shows variation in colouration, size of spots and width of black borders.



Arhopala eumolphus eumolphus- Female (Underside)

Wing expanse: Male, female 44-50 mm.

Habits: This butterfly is very beautiful showing green metallic colouration. Its flight is fast but the butterfly does not fly far and soon drops suddenly among the foliage and settling on the underside of leaves.

Habitat and ecology: It is fairly common at low elevations in Sikkim during October-November but occurs throughout Assam.

Life history: The early stages are attended by ants; and the larvae are abnormal in shape being much flattened.

Distribution: India: Assam, West Bengal, Manipur, Sikkim. Elsewhere: China (Hainan), Myanmar, Thailand.

Status: Not rare.

106. *Cheritra freja* (Fabricius)

Hesperia freja Fabricius, 1793.

Cheritra freja (Fabricius): De Niceville, 1890: Evans, 1932: Wynter-Blyth, 1957; Cantlie, 1962; Varshney, 1997.

Common name: Common Imperial.

Diagnostic characters: Male upperside dark brown and purple tinged but female dark brown without any purplish tinge, hind wing with white tornal spots larger and two unequal tailes.

Cheritra freja freja- Female (Upperside)

Morphological characters: **Male-** *Upperside* dark brown, purple tinged in male; hind wing tornal area white with black spots. *Underside* white to pale brown; faint bars at end of cells; fore wing with dark and narrow outer discal line; hind wing with outer discal and marginal lines; tornal black spots crowned with metallic scales; tail 5 mm long at vein 1b and tail 22 mm long at vein 2. **Female**- *upperside* dark brown and without any purplish tinge; white spots of greater size present at tornus of hind wing.

Variation: The species is variable and its two subspecies occur in India.

i) *C. freja freja* (Fabricius) - Male- underside pale ochreous; dakening at apex and termen of fore wing and apex of hind wing. Female- underside white, outwardly ochreous; fore wing with discal line ochreous. Not rare. Uttarakhand (Kumaon). Myanmar (Tavoy).

ii) *C. freja jaffra* (Butler) - Upperside of hind wing with white area more extensive and underside of fore wing with discal line regular and continuous. Not rare. South India.

Cheritra freja freja- Female (Underside)

Wing expanse: Male, female 38-42 mm.

Habits: It is a hill species, keeping to thick and wet jungle. It flutters weakly at the edges in jungles and forest clearings. It basks on top of a tree with wings wide open. when disturbed, it flies fast and generally settles on top of a tree. The tails of this species render it very conspicous on the wings.

Habitat and ecology: It is confined to the western ghats in South India and to the hilly regions of North-east India. It does not fly above 750m in the South, higher in the North.

Life history: The larva is green or flesh-coloured, across the dorsum extends a longitudinal ridge at the sides of which there are brownish tubercles. Sometimes the middle of the dorsum is occupied by a brown saddle-spot. The pupa is at first green and later on yellowish brown. The pupa is smooth but only on the dorsum of the abdomen there are pointed uneven places.

Food-plants: *Cinnamomum zeylanicum* (Cinnamon), *Ixora* sp., *Saraca asoca* (Ashoka), *Xylia xylocarpa*.

Distribution: India: Assam, Sikkim, South India, Uttarakhand. Elsewhere: Myanmar, Sri Lanka.

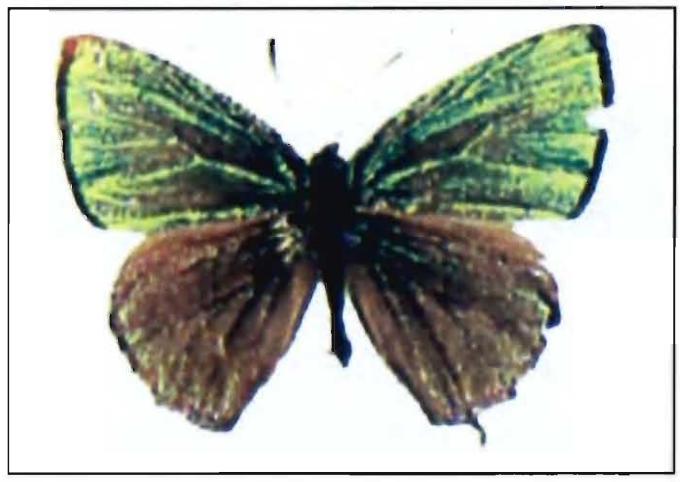
Status: Not Rare.

107. *Chrysozephyrus kabrua* (Tytler)

Zephyrus kabrua Tytler, 1915.
Thecla kabrua Tytler: Evans, 1932; Wynter-Blyth, 1957.
Neozephyrus kabrua (Tytler): Howarth, 1957.
Chrysozephyrus kabrua (Tytler): Cantile, 1962; Bridges, 1988; Varshney, 1997.

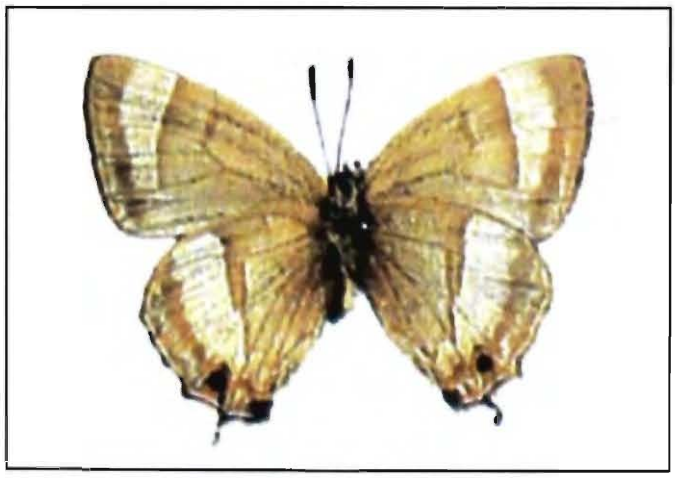
Common name: Kabru Hairstreak.

Diagnostic characters: The upperside of fore wing is shining metallic green in male but dark brown in female.In both sexes, underside of wings pale silvery brown and without any silver line.



Chysozephyrus kabrua- Male (Upperside) after D'Abrera, 1986

Morphological characters: **Male**- *Upperside* of fore wing with border narrow (0.5-0.75mm); hind wing with a terminal narrow blue line from dorsum to vein 3, this blue line may be reduced to a speck or obsolete on either side of vein 2 at the termen. Underside silvery fawn in a lighter shade, the area between the postdiscal and submarginal lines being almost white. Underside of hind wing without a bar in area 7. **Female**- *Upperside* of fore wing with 2 apricot-buff patches- one triangular shaped at end of cell and another lozenge shaped in area 3; a metallic- sapphire blue patch each in cell and in areas 1a, 1, 2, and 3, that in area 1a extending to three-



Chysozephyrus kabrua- Male (Underside) after D'Abrera, 1986

quarters length of dorsum; hind wing irrorated with blue scales in the lower half of the cell and a few at base of tail at vein 2. *Underside* of fore wing brownish drab paler towards dorsum, discocellular bar deep brownish drab-grey, bordered broadly inwardly with deep brownish drab and outwardly to same width with pale purplish drab; submarginal line pale purplish drab, marginal band deep brownish drab.

Chysozephyrus kabrua- Female (Upperside) after D'Abrera, 1986

Variation: The species shows variation in colouration and wing markings.

Wing expanse: Male, female 36-40 mm.

Habits: The butterfly is shade loving and during dry weather keeps mainly to glades and nullahs having water, but later it visits hill tops, flying fast round trees, bushes and finally settling on upper surfaces of leaves with their wings closed.

Habitat and ecology: The butterfly is found during June-August at elevations of 1800-3600m in north-eastern part of India.

Food-plants: Bushes and trees.

Distribution: India: Manipur, Nagaland, and Sikkim.

Status: Not rare. This species is protected under Schedule II (Part-II) of the Indian Wildlife (Protection) Act, 1972 and subsequent amendments.

108. *Iraota timoleon* (Stoll)

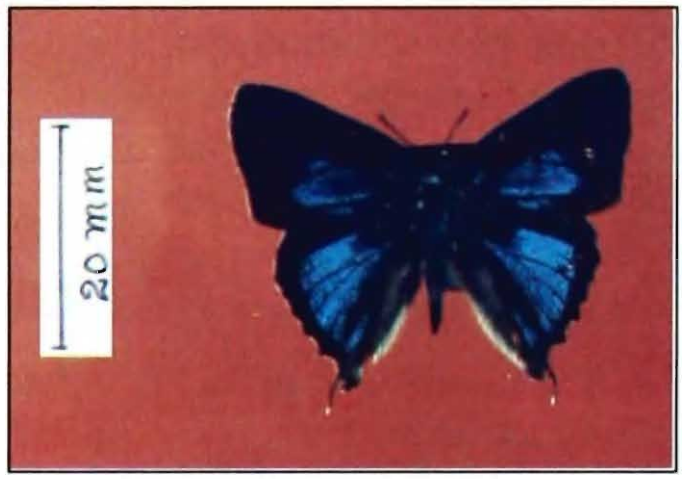
Papilio timoleon Stoll, 1790.

Iraota timoleon (Stoll): Evans, 1932; Wynter-Blyth, 1957; Cantlie, 1962; Varshney, 1997.

Common name: Silverstreak Blue.

Diagnostic characters: Male upperside bright shining blue or greenish blue, tailed at vein 1, wing margins crenulate, hind wing underside silver streak, if present, never reaching margin; female upperside dark brown and tailed also at vein 2.

Morphological characters:



Iraota timoleon timoleon- Male (Upperside)

Male- *upperside* deep blue or greenish blue, with broad black borders on fore wing and hind wing and apex of fore wing; underside dark reddish brown with silver streak in cell of fore wing, discal spots present; hind wing generally ochreous towards margin, usually with broad irregular basal streak, which may be silver or vary even to the reddish ground colour, and with obscure zig-zag discal markings. Wing margins more or less crenulate, tailed at vein l. **Female**- *upperside* dark brown, with shining purple lower discal patch on fore wing; hind wing sometimes with small central patch of purple scales, additional tail present at vein 2.

Variation: This species is variable and its two subspecies occur in India.

Iraota timoleon timoleon- Male (Underside)

i) *I. timoleon arsaces* (Fruhstorfer) - Smaller. Greenish blue areas wider. Madhya Pradesh, South India.

ii) *I. timoleon timoleon* (Stoll)- Male upperside deep blue. Underside hind wing with silver streak, if present, is clear. Andaman & Nicobar

Islands (Andamans), Orissa, Uttarakhand (Mussoorie). Myanmar (Shan States)

Wing expanse: Male, female 40-48 mm.

Habits: It lives very much among the foliage of trees, especially of the Banyan. It is very fast on the wing but seldom flies far. It is a pest on fruits.

Iraota timoleon timoleon- Female (Upperside)

Habitat and ecology: It is mainly found at low elevations in wet, hilly regions. Very sparingly, it flies to elevation of 2150m in the Himalaya.

Life history: The larva is onisciform. It is 22mm in length and its surface smooth. Its head is very small; the 2nd segment rather large, 3rd and 4th segments progressively larger, then gradually decreasing in width to the anal segment.The constrictions between the segments are very shallow; head pinkish, dorsal area pale pink shading off laterally into pale greenish. The anal segment is entirely pale greenish and there are three series of annular dots on each side. The pupa is very short and thick. It is dark brown and streaked with dark brown. The head-case is well marked and the abdomen very slightly constricted behind the thorax, and posteriorly much rounded.

Iraota timoleon timoleon- Female (Underside)

Food-plants: *Ficus benghalensis* (Banyan), *F. glomerata* (Gular, Dumur), *F. religiosa* (Peepul), *Punica granatum* (Pomegranate).

Distribution: India: Andaman & Nicobar Islands, Assam, Himachal Pradesh, Madhya Pradesh, Maharashtra, Orissa, Sikkim, South India, Uttar Pradesh, Uttarakhand, West Bengal. Elsewhere: Myanmar.

Status: Not rare locally.

109. *Virachola isocrates* (Fabricius)

Hesperia isocrates Fabricius, 1793.
Virachola isocrates (Fabricius): De Niceville, 1890; Wynter Blyth, 1957; Cantlie, 1962; Varshney, 1997.
Deudorix isocrates (Fabricius): Bridges, 1994.

Common name: Common Guava Blue.

Diagnostic characters: Male dark brownish voilet-blue and underside brown. Female large and pale brown; fore wing with orange patch beyond end of cell.; underside grey with a band of linked spots.

Morphological characters: **Male**- *upperside* dark fuscous brown and shot brilliant violet blue, and sometimes paler on disc; hind wing with a basal brand in area 6. *Underside* of wings pale grey; markings slightly darker than the ground colour; fore wing with a dark brown tuft at middle of inner margin, without a spot in cell, discal band prominent and straight; hind wing with a slender tail at vein 2 but without a basal spot in area 7. **Female**- like male but larger, *upperside* paler fuscous brown, darker towards the end of cell in fore wing, beyond which an orange patch and sometimes a similar tornal patch also present; hind wing having a prominent orange-crowned black marginal spot in area 2.

Variation: The wing markings show variation in size and colouration. In female, a distinct orange patch beyond cell may be diffused.

Wing expanse: Male, female 34-50 mm.

Habits: Its flight is swift and powerful. Both sexes settle readily on flowers and the males are fond of basking on high trees on the tops of the hills. It is common on Pomegranate and Guava plantations. It is a pest of Pomegranate and Gauva plantations.

Virachola isocrates- Female (Upperside)

Habitat and ecology: The butterfly is widespread and common everywhere in India except in the desert, but most abundant on the open plains where the rainfall is low. It ascends about 2135m in the Himalaya.

Life history: The female chooses a tree that bears a stoned fruit and lays eggs on flowers, stalk, leaves etc., always one at a time. On hatching out, the little larva eats into the carpel or the fruit. The full grown larva easily pierces the stone and has enough food for its survival inside the fruit. After finishing one fruit, it looks for another. During looking for another fruit, it may fall prey to its enemies like birds. A large choosen fruit may accommodate several larvae. The full grown larva is blackish-brown with large brown head. The larva undergoes pupation inside the last fruit. Before pupation, it spins a web across the orifice, the web having two holes at the sides and hinged on one side as well. The pupa is formed inside, attached by the tail and a body-band to the surface. The imago after emerging runs to a suitable place from which to hang and develop its wings.

Virachola isocrates- Female (Underside)

Food-plants: *Manilkara zapota* (Sapota), *Catunaregam nutans, C. spinosa, Citrus aurantium* (Khatta), *Emblica officinale* (Amla, Aonla), Inside the fruits of *Eriobotrya japonica* (Lokat, Loquat), *Gardenia latifolia* (Boxwood Gardenia), *Limonia acidissima, Litchi chinensis* (Litchi), *Prunus amygdalus* (Almond), *Prunus domestica* (Common Plum), *Prunus persica* (Peach), *Psidium guajava* (Gauva), *Punica granatum* (Pomegranate), *Pyrus communis* (Pear, Nashpati), *Pyrus malus* (Apple), *Strychnos nux-vomica* (Nux–Vomica, Strychnine Tree), *Tamarindus indica* (Tamarind), *Tamilnadia uliginosa.*

Distribution: India. Assam, Maharashtra, Meghalaya, Manipur, Nagaland, Orissa, Uttarakhand, West Bengal. Elsewhere: Myanmar, Pakistan, Sri Lanka.

Status: Common.

SUPERFAMILY HESPERIOIDEA

FAMILY HESPERIIDAE

Antennae are widely separated at base and are generally curved or hooked at the apex. Eyes smooth. All the three pairs of legs well developed. Fore tibiae with a bluntly pointed appendage (tibial epiphysis), usually densely scaled, on the inner edge. Hind tibiae usually with a medial as well as a terminal pair of spurs. Both wings all veins arising from the wing base or from the cell, none being forked or coincident beyond the cell. On both wings, but specially on the hind wing , vein 5 may be faint or indicated only by a fold in the wing. The wings are short in proportion of the stout body, and the butterflies are robust in build.

The colour of the wings is dark brown or ochreous, with white or yellowish hyaline spots, which may be conjoined to form a hyaline band, and the markings on the upperside are usually confined to the fore wing. In the allied species, wing pattern shows little or no difference and, therefore, identification is only possible by examination of the genitalia.

The butterflies may be crepuscular in some groups. The adults are strong on the wing, but the flight is short and not sustained.

The larvae are usually stout, and taper towards the extremities, they may be naked or with dispersed bristles, and the legs are short. The larval head is usually dark and contrasts with the rest of the body. In some species the larva is covered with a loose white filamentous material which may be rubbed off on handling. The larvae of many species live in the rolled up leaves of the food plant and feed only at night. With a few exceptions the larvae of the subfamily

Hesperiinae feed on monocotyledons, while those of the Coeliadinae and Pyrginae feed on dicotyledons.

The pupa is long and without angular projections, and is usually enclosed in a shelter made by drawing together the leaves of the food plant. In some species the pupa is exposed and attached to support by the anal extremity, or by a silken median girdle.

SUBFAMILY COELIADINAE

Adults robust and large in size. Butterflies are crepuscular in habit. Third segment of palpi porrect, long, thin, naked and blunt at the apex. Wings upright in repose. The male is without a costal fold on fore wing. Fore wing usually with the origin of nein 5 nearer vein 6 than vein 4, in some species fore wing has a stigma or brand on upperside (e.g. *Hasora*); hind wing lobate. the hind tibiae have a hair tuft. Abdomen shorter than the hind wing dorsum.

The larvae are brightly coloured and feed on dicotyledons.

110. *Badamia exclamationis* (Fabricius)

Papilio exclamationis Fabricius, 1775.
Badamia exclamationis (Fabricius): Evans, 1932, 1949; Wynter Blyth, 1957.

Common name: Brown Awl.

Diagnostic characters: Upperside of wings dark brown with bases paler. Fore wing long and narrow with three hyaline spots in male and more such spots larger and yellow in female. Hind wing unmarked and with tornal lobe.

Morphological characters: **Male** -*upperside* of wings dark purplish brown with bases greyish olive brown; fore wing with three slender whitish elongated semitransparent spots in areas 2 and 3 and in the cell. Hind wing unmarked and produced/lobed at vein1b. *Underside* pale greyish brown; fore wing with discal area darker brown, spots as on upperside, posterior border pale ochreous. Hind wing pale brown with a dark brown tornus surmounted by whitish subtornal spot. **Female**- *upperside* of fore wing with spots in areas 2 and 3 and in the cell being larger and yellower, an additional spot in area 1b or more apical spots.

Variation: This species exhibits variation in size, number and colour of spots. The dry season forms may be small, light coloured and fore wing without hyaline spots.

Wing expanse: Male, female- 50-58mm.

Badamia exclamationis- Male (Upperside)

Habits: The butterfly mainly flies early and late or in the shade of the jungle. It is one the swiftest fliers. In sunshine, it feeds upon some attractive flowers upon which it dashes in a furious, whizzing flight and which it leavs again in the same swift and abrupt manner. The males bask on the upperside of leaves and often settle on bird's droppings.

Habitat and ecology: It is found commonly in all types of regions, but particularly in jungle and dense forests. It occurs up to elevations of 750m in South India and 2150m in the Himalaya.

Life history: The egg is light green and dome-shaped. The larva is pale violaceous yellow and with numerous black transverse dorsal lines. The stigmata are whitish and encircled with black. The pupa is violaceous.

Food-plants: *Anogeissus acuminata* (Chakwa, Dhaura,Yon), *Buddleja*, Canna, *Chionanthus zeylanicus, Combretum albidum, C. extensum, C. latifolium, C. ovailfolium, Duranta* sp., *Ficus* sp., *Hiptage benghalensis* (Madhavilata, Madhubha Lata), *Lantana, Leea, Malpighia punicifolia* (West Indian Cherry), *Terminalia belerica.*

Distribution: India: Andaman & Nicobar Islands, Assam, Himachal Pradesh, Karnataka, Mahrashtra, Meghalaya, Nagaland, Orissa, Sikkim, South India, Uttarakhand, West Bengal. Elsewhere: Myanmar, Sri Lanka, other parts of the Oriental Region, Australian, Hawain and Papuan Region.

Status: Not rare. Locally common.

SUBFAMILY PYRGINAE

Only *Capila* species are crepuscular in habit. Third segment of palpi usually short and conical. Wings flat in repose. Fore wing usually

with the origin of vein 5 nearer vein 6 than vein 4, a costal fold present in the male of *Capila phanaeus*, brand absent; hind wing not markedly lobate. Hair pencils often present on the hind tibiae. Abdomen shorter than the hind wing dorsum.

The larvae are unicolorous green, brown or white and with a few exceptions feed on dicotyledons.

111. *Celaenorrhinus ruficornis* (Mabille)

Celaenorrhinus ruficornis Mabille, 1878. (author's name if in bracket)
Celaenorrhinus ruficornis Mabille: Smeteck, 2007.

Common name: The Tamil Spotted Flat.

Diagnostic characters: Antennal shaft chequered, club white in male, white at base in female. Upperside dark brown; fore wing with discal spot in area 2 and a spot at end of cell being separate; hind wing only obscurely marked.

Morphological characters: **Male -** Antennal shaft chequered and club white. *Upperside* of both wings dark brown and clothed with dull dark yellow hairs. Fore wing with or without a spot in area 1b, a discal series of more or less semitransparent white spots of which costal spot being bifid, discal spot in area 2 and a spot at end of cell being separate. Hind wing with a large suffused black spot at end cell and obscure discal row of spots, cilia alternately black and white. *Underside* mottled with obscure grey; fore wing without inner, lower spot in area 1b, the upper spot followed by a more or less developed tornal whitish area; hind wing with obscure suffused yellow spots. **Female-** almost like that of male but larger and antennae white at base.

Variation: The species shows variation in size and presence or absence of white spots on wings.

There are two subspecies in India.

i) *C. ruficornis fusca* Hampson- Upperside of hind wing with large suffused dark spots and underside of hind wing with obscure suffused yellow spots; cilia on hind wing narrowly white and chequered. South India

ii) *C. ruficornis area* Herrich-Schaeffer – Like *fusca* but darker; upperside of hind wing with black markings obsolete and discal spot in space 1b always more conspicuous. However, occurrence of subspecies *area* in India is doubtful. "Bengal" and Celebes.

Celaenorrhinus ruficornis- Male (Upperside)

Wing expanse: Male, female 45-50 mm.

Habits: These butterflies are shade lovers, coming out of their jungle haunts only in the early morning and evening and sometimes on cloudy days. They visit flowers and rest on the under surfaces of leaves.

Habitat and ecology: It is common along Western Ghats, particularly during the wet season. It may be captured by beating *Lantana* bushes along roads and paths.

Food-plants: *Lantana* bushes, *Strobilanthes callosus.*

Distribution: India: South India,West Bengal.

Status: Common on the Western Ghats.

SUBFAMILY HESPERIINAE

Many species diurnal. Wings erect in repose, with secondary sexual characters, in many species male with some form of discal brand or stigma on upperside of fore wing, and in other species one or other wing with hair tufts. Fore wing with the origin of vein 5 not nearer vein 6 than vein 4. Hind tibiae without erectile hair tufts (except a hair fringe in *Iambrix distanti*) nor associated pits on the abdomen lined with specialized scales. Abdomen as long as or longer than the hind wing dorsum.

The larvae are yellowish, whitish or green and feed on monocotyledons (except in *Udaspes folus* and *Cupitha purreea*).

112. *Gangara thyrsis thyrsis* (Fabricus)

Papilio thyrsis Fabricus, 1775.
Gangara thyrsis thyrsis (Fabricus): Evans, 1932; 1949.
Gangara thyrsis (Fabricus): Wynter-Blyth, 1957.

Common name: The Giant Red-eye.

Diagnostic characters: Upperside of fore wing with well marked sub-apical spots, as well as large central spots.

Morphological characters: **Male-** *Upperside* dark chocolate-brown. Fore wing with three large quadrate semitransparent yellow spots placed triangularly- the first large spot across the cell, second also large in area 2 and third small one in area 3, three smaller quadrate subapical spots of which upper two being almost joined, an additonal small dot below the subapical spots and another on the osterior margin, cilia at posterior angle brownish white. Hind wing with cilia at anterior angle brownish white. *Underside* of fore wing irrorated with greyish scales near the apex, posterior margin pale brownish white, yellow spots as on upperside, a male a tuft present along vein 1b. Hind wing with greyish scales forming bands across the wing. **Female-** almost like that of male but *underside* of fore wing without a tuft present along vein1.

Gangara thyrsis thyrsis- Female (Upperside)

Gangara thyrsis thyrsis- Female (Underside)

Variation: The upperside of fore wing may or may not have a spot above vein 1b. Only the nominate subspecies occurs in India.

Wing expanse: Male, female 70-76 mm.

Habits: It is one of the largest of the Skippers and is crepuscular, flying very shortly after dawn and again at dusk. During the day, it rests in some concealed spot with the wings closed over the back. It visits flowers.

Habitat and ecology: It is found near its foodstuff (palm trees), mainly in hilly, jungle regions but also on the plains.

Life history: The egg is not known. The larva lives in leaf-casings and is white, with a fine waxy pubescence, the latter can easily be removed. It is cylinderical and rose-brown. The full grown caterpillar is about 62 mm in length. It lies with its head turned on its side. The pupa is of dingy yellowish-white colour, with a long extended case for the proboscis which is undulately curved or rolled, projecting beyond the pupa. The pupa is hidden in the three rolled up leaves, fixed by the extremity of the abdomen to a woven tripod in such a manner that it can move freely in any direction. If it is touched or disturbed it makes a loud rattling noise to scare away the intruder. The imago emerges in the afternoon.

Food-plants: *Calamus rotang* (Chachi Bet), *Caryota urens*, *Cocos nucifera* (Coconut), *Phoenix sylvestris* (Wild Date Palm, Date Sugar Palm), *Phoenix* sp. and other monocotyledons.

Distribution: India: Andaman & Nicobar Islands, Assam, Bihar, Maharashtra, North-West India, Sikkim, South India, West Bengal. Elsewhere: Indonesia (Borneo, Celebes, Sumatra), China (Hainan), Indo-China, Malaya, Myanmar, Nepal, Nias, Thailand.

Status: Not rare.

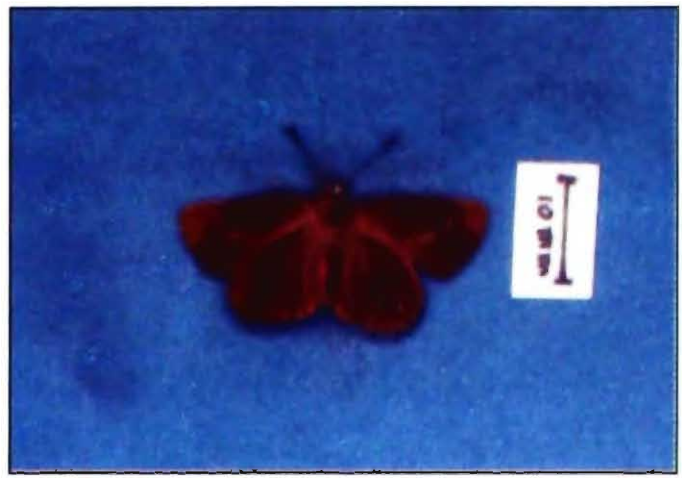
113. *Iambrix salsala* (Moore)

Nisionides salsala Moore, 1865.
Iambrix salsala (Moore): Evans, 1932; 1949; Wynter-Blyth, 1957

Common name: The Chestnut Bob.

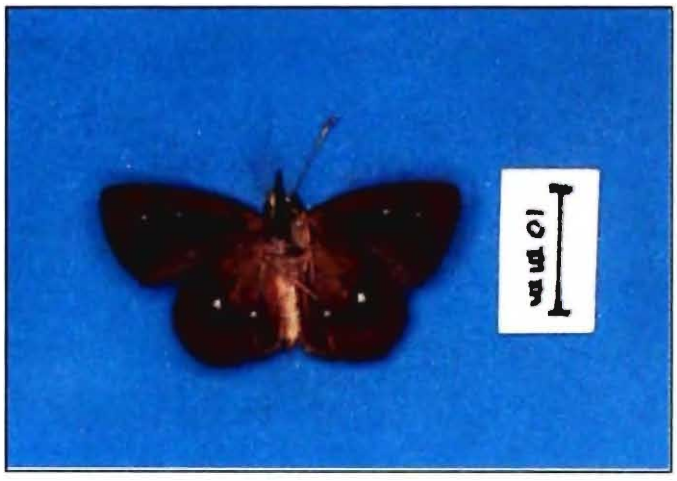
Diagnostic characters: Male upperside dark brown with an

obscure brand in cell and underside of hind wing with black edged silver spots. Female upperside paler with discal white and semi-transparent spots prominent.



Iambrix salsala salsala- Male (Upperside)

Morphological characters: **Male-** *upperside* dark brown with some dark orange scaling; fore wing with an obscure brand in cell along the cubitus between the origins of veins 2 and 3, vein 2 being nearer to vein 3 than base, a series of 1-8 faint orange discal spots which above vein 2 may be absent. *Underside* of hind wing with ochreous super-scaling and black edged silver spots in areas 1b and 7 may be faint or absent but the spot in area 5 being more prominent and placed much nearer end of cell than the termen and rarely a spot present in the cell. **Female-** *upperside* paler with discal white and semi-transparent spots prominent, fore wing with less numerous white dots reaching area1b or white dots absent.



Iambrix salsala salsala- Male (Underside)

Variation: The species shows variation in size, colouration of spots and their presence or absence.

There are two subspecies in India.

i) *Iambrix salsala salsala* (Moore) – Upperside of male fore wing with ochreous spots smaller, duller but may be numerous or absent; costa not ochreous; female fore wing with white dots less numerous or absent and nearly reaching space 1b.

ii) *Iambrix salsala luteipalpis* Ploetz.- Upperside of male fore wing with ochreous spots in areas 1b, 2 and 3 and basal costa bright ochreous; female fore wing with usually a complete row of mostly

Iambrix salsala salsala- Female (Upperside)

hyaline white dots. South India. Sri Lanka.

Wing expanse: Male, female 26-30 mm.

Habits: The butterfly flies and rests low, taking short flights and often returning not to the same leaf. It prefers shade and visits flowers.

Habitat and ecology: It occurs in hills and forests where the rainfall is heavy. It is found commonly along jungle paths, at road sides and in forest clearings. It ascends to 1200m.

Iambrix salsala salsala- Female (Underside)

Life history: The butterfly lays its eggs on the upperside of the blade bamboo or leaf near the ground. The egg is smooth, dome shaped and red in colour. The larva is watery green, cylindrical with the sides yellow and dorsally minutely spotted with green; dorsal and subdorsal dark green line. Its head is dirty yellow and triangular in shape when viewed from the front. The larva makes a lax cell initially, but later often lies on the open surface of the leaf. The pupa is formed inside the cell and is covered with white powder. It is stout, circular in transverse section. Its head is broad and eyes are prominent. The thorax is slightly humped and dark brown and the surface is slightly hairy.

Food-plants: *Bambusa arundinacea* (Thorny Bamboo), grasses, generally broad leaved coarse grass.

Distribution: India: Assam, Sikkim, South India, Uttarakhand, West Bengal. Elsewhere: Bangladesh, China (Hainan), Hong Kong, Indo-China, Java, Malaysia, Myanmar, the Philippines, Sri Lanka, Sumatra, Thailand.

Status: Common.

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NAMES OF SPECIES OF FOOD-PLANTS

Names of species and genera of food-plants of butterflies under their families have been given. The nomenclature is mainly after "*The Plant List* (2010). Version 1. Published on the Internet; http:// *www.theplantlist.org/* (accessed 1st January)"

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